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INTRA-THEATER MOBILIZATION:
GUIDANCE, PROCESS, AND TOOLS

THESIS

Christopher S. Cummins
Captain, USAF

AFIT/GLM/LSM/92S-12

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**INTRA-THEATER MOBILIZATION:
GUIDANCE, PROCESS, AND TOOLS**

THESIS

**Presented to the Faculty of the School of Systems and Logistics
of the Air Force Institute of Technology
Air University
In Partial Fulfillment of the
Requirements for the Degree of
Master of Science in Logistics Management**

**Christopher S. Cummins, B.A.
Captain, USAF**

September 1992

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Preface

This study focused on an aspect of unit combat and logistical readiness that has been ignored. While guidance and organization for the strategic movement of USAF forces is plentiful and comprehensive, those who mobilize USAF units must depend on *ad hoc* approaches to the movement of forces that takes place within a theater of operations. This thesis is an attempt to build the foundation for a better approach to intra-theater mobilization by describing the intra-theater mobilization process and the tools used to execute that process.

I am indebted to many people for the help they gave me in this study. The logistics planners who responded to the questionnaires. The faculty of AFIT has been more than generous with their time, and advice. I am indebted particularly to my thesis advisors, Colonel Terence Berle (Ret.) and Major John Scott for their patience, insight, and advice. Finally, I wish to thank my family. My children, Megan and Matthew, I appreciate for being the children that they are. For my wife, Mary Rita Cummins, I reserve my deepest appreciation, for being my partner in life.

Christopher S. Cummins

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Abstract

The study investigated the process of USAF unit level mobilization for movement within a theater of operations. Virtually all of the guidance and organization for unit level mobilization within the USAF is focused on inter-theater movement. Consequently, while the need for theater mobility is real, USAF units may not be well grounded in the procedures and techniques necessary to move successfully. The purpose of the study was to describe the essential process of a unit level intra-theater mobilization and determine differences from inter-theater mobilizations. In addition, the available tools for accomplishing the tasks of mobilization within a theater of operations were investigated. The literature review established the need for theater mobility and showed that intra-theater mobilization occurs under more restrictive conditions. The methodology developed a basic process model of unit mobilization actions. The model was built on seven essential task areas: identification of requirements, prioritization and sequencing, physical preparation, loadplanning, marshalling, loading, and direction and control.

The model was validated through a Delphi survey. USAF personnel active in mobility received questionnaires on the subject, and their responses served to achieve a consensus of expert opinion.

INTRA-THEATER MOBILIZATION:
GUIDANCE, PROCESS, AND TOOLS

I: The Problem Statement

Introduction

Mobility is a capability that is critical for successful military operations, especially for an expeditionary military force. Air Force Regulation 28-4, USAF Mobility Planning, states:

Mobility is a mission essential program supporting national objectives during wartime or contingency operations and must be afforded sufficient command emphasis to ensure national readiness. (15:5)

The United States Air Force (USAF) has recognized the importance of mobility and has provided considerable guidance to its operational units on how to mobilize. This guidance is incomplete, though, because it focuses entirely on deliberately planned units movements. Once within a theater of combat operations, the rigors of combat can demand that units mobilize and move in situations when deliberate planning is not possible. USAF mobility planning guidance does not address these types of moves.

The research in this thesis describes the most basic tasks a unit must complete in order to mobilize effectively within a theater of operations. This description of the mobilization process is developed as a prerequisite to any

specific procedural guidance. A model of the basic mobilization process has been built and was modified and validated by base-level USAF mobility officers.

Movement, Mobility, and Mobilization

This thesis focuses on a specific aspect of the mobility process. That aspect is mobilization at the unit level. Movement, mobility, and mobilization are separate but related concepts. Their definitions are as follows:

Movement, or maneuver, is "a strategic or tactical shift in the location of military troops, ships, or aircraft" (42:774).

Mobility is defined by the Department of Defense as:

a quality or capability of military forces which permits them to move from place to place while retaining the ability to fulfill their primary mission. (27:237)

Mobility, by this definition, is a quality of a particular type of movement; one that moves forces and retains the ability to fulfill their mission.

Mobilization is defined by the Department of Defense as:

the process by which the armed forces or part of them are brought to a state of readiness for war or other national emergency. This includes assembling or organizing personnel, supplies, and materials for active military service. (27:237)

This definition is broad and can include many kinds of mobilization, e.g. mobilization of a nation's industrial base, or mobilization of reserve components of the armed

forces for active duty. In this thesis mobilization is used narrowly to refer to that portion of mobility where a unit is "brought to a state of readiness" for movement.

Mobilization in this sense is a part of mobility; it is a unit's preparation for movement that retains the capability to perform the mission.

The Problem

The capability for unit-level mobilization is especially critical to modern American military operations. With the Cold War over, the size of the defense establishment is shrinking and forces are departing from forward bases in Europe and the Pacific. Consequently, the military will rely increasingly on expeditionary forces that will deploy to a crisis location from the continental United States (18:4-6). The need for timely response by these expeditionary forces has been recognized by the Secretary of the Air Force: "Unlike the past 45 years, the location, dimension, timing and technology level of these residual threats will be difficult to predict. We may need to fight with less preparation than we had in the Gulf" (35:4). Timely response to crises worldwide will depend on the ability to mobilize quickly.

Standardized Guidance. The United States Air Force (USAF) recognizes the importance of mobility and publishes extensive procedural guidance on mobilization for deployable USAF units. The primary mobility procedural guide, Air

Force Regulation (AFR) 28-4, USAF Mobility Planning, defines mobility as mission essential (15:5). The guidance is aimed at preparing units to mobilize on demand, so that in a crisis situation the units would be, as the motto of the 726th Tactical Control Squadron says, "prepared to go". The guidance may not achieve that aim, though, because it does not recognize the potential for units to mobilize under differing conditions. Instead the guidance covers only moves that are deliberately planned moves (15:5).

USAF mobility guidance presents a standardized approach to mobilization. One informational (non-guidance) document recognizes the potential for mobilization in different situations, Definition of the Employment Role of Logistics Planners, advocates using the standardized approach, saying mobility planners will:

coordinate the requirements and prepare plans and schedules of events for any follow-on unit moves or redeployment to home station. Follow-on unit deployments will follow standard mobility procedures...(20:5)

The document recognizes that besides the initial move from home station into the theater of operations, a unit may also need to make a follow-on move within the theater (20:5).

Diverse Situations. Mobility and mobilization can be described as inter-theater (between theaters of operations) or intra-theater (within a theater of operations). At the inter-theater level, movement means force projection and the positioning of forces into theaters of operations. This can

include high volume moves in a short period of time, major port activity, and reliance on complex and powerful automated management systems, for example the Joint Operations and Execution Planning System (JOPES), to organize and coordinate complex force movements (2:14). At the intra-theater level mobility focuses on the movement of forces within the theater (2:14-20).

The typical inter-theater unit move, and the focus of USAF mobility guidance, is the initial move from home station into a theater of operations. This kind of move can usually be characterized as deliberately planned. Deliberate planning occurs when the time and resources available to plan and prepare are relatively abundant (32:6-3,6-5). If USAF units are tasked to mobilize and move within a theater, however, the time and resources for a deliberately planned move may not be available.

Intra-theater unit moves can be deliberately planned in some cases but can also be actions taken in response to changing combat situations. A move to a better operating site, for instance, can be managed as a deliberately planned move if time and resources are not short. During the Gulf War, the 4th Tactical Fighter Wing (Provisional) moved from Thumrait, Oman to a newly prepared base in Saudi Arabia in order to get closer to enemy positions and targets. This move took place months before hostilities broke out. The need to move quickly was relatively unimportant and the move was managed as a deliberately planned move.

In other situations, intra-theater moves can be extremely time sensitive and require flexibility in a unit that precludes pulling standardized plans off the shelf. These moves often result from the pressures of combat, such as: retreat from a base under attack (26:119-121); moving forward to cover advancing ground forces (26:111-112); and, opportunistic moves to take advantage of unexpected "windows of opportunity" that appear during combat (41:20-29 JAN 91). Mobilization in these situations, because of the shortage of time and resources for planning, is not usually deliberately planned.

USAF doctrine does not designate inter-theater or intra-theater mobility as a more important aspect for force movement. In particular, it does not establish intra-theater mobility as less important than inter-theater. Intra-theater mobility is seen as often the best way to "redistribute assets quickly under crisis conditions" (9:5).

The Need for Different Guidance. Existing USAF mobility guidance for units focuses on deliberately planned mobility. It does not address other types of intra-theater moves. In the quote given earlier, the paper Definition of the Employment Role of Logistics Planners refers to intra-theater moves as follow-on moves. That paper implies that such moves are no different than a move from home station, and so should follow "standard mobility procedures" (20:5). Existing mobility guidance ignores intra-theater mobility that is not deliberately planned intra-theater mobility. As

a result, procedures for unit moves that are not deliberately planned moves are not available.

If non-deliberately planned moves are substantially different from deliberately planned moves, then the lack of procedural guidance could mean less effective mobilization. Since the purpose of mobilization is to prepare for a mobility move, and the purpose of a mobility move is to provide time and place utility for the operations of military forces, the end result of less effective mobilization may be less effective operations.

Research Objective

The need for intra-theater unit-level mobilization procedures, where deliberate planning is not practical, should be examined. These procedures should be appropriate in situations that require time-sensitive or crisis action planning (32:6-3). However, before procedures detailing how a unit can best prepare to move can be detailed, a description of what a unit must do must be developed (40:15-16). Consequently, the objective of this research is primarily to describe what a unit must do to mobilize in a non-deliberate situation.

The research objective is: Describe the essential process a unit must complete to accomplish an intra-theater move and the mobility tools best suited for that process.

The focus is on unit-level mobilization, which means unit preparation of an operational element for transport.

Describing what a unit must do to be able to mobilize is a prerequisite for establishing how (procedures) a unit should go about mobilizing.

Investigative Questions

Investigative questions are used to answer the research objective and so are aimed at describing the basic elements of an intra-theater mobilization. The six specific questions are as follows:

- 1) Is intra-theater mobilization different than inter-theater mobilization? In particular, are time and resources more limited?
- 2) What are the essential tasks a unit must complete for intra-theater mobilization?
- 3) Can the mobilization process be depicted as a sequential, integral system made up of dependent events?
- 4) Are unit personnel trained in mobility necessary for success?
- 5) Which existing mobilization tools would be best suited to accomplishing the essential tasks of intra-theater mobilization?
- 6) If existing tools are not good enough to do the job, how could they be improved?

Scope

The scope of research effort is focused on identifying the essential tasks a unit must complete to accomplish an

intra-theater mobilization and on determining whether intra-theater mobilization is different enough to warrant different procedural guidance. Four significant limits on the scope of the research are noted:

1. The research addresses only the unit's role in mobilization. The transport role or unit beddown after transportation is complete is not analyzed. Also, organizational roles at a level higher than the unit level, such as theater command and component command roles, are not addressed.

2. The research centers on intra-theater mobilization, where time is a constraint because of a combat imperative. Deliberately planned moves, such as inter-theater strategic moves or intra-theater management moves, are not directly addressed and are included only for purposes of comparison to mobilization that is not deliberately planned.

3. The research is not limited to any specific mode of transportation, whether airlift, sealift, rail or truck. All of the transportation modes require equipment and personnel to be prepared, staged, and loaded, and so are all equally applicable to this research. This research is not meant to uncover the differences in preparation for transport by land, air, or sea modes, but concentrates on the basic mobilization tasks a unit must complete regardless of mode.

4. The research is descriptive in nature. The goal of the research is a description of the mobilization process.

Guidance on mobilization procedures, which is prescriptive in nature, can only proceed when the process has first been adequately described.

Thesis Overview

The remainder of this thesis will be divided into four chapters. Chapter II is a review of the relevant literature that illustrates the value of mobility through historical examples; mobility in the context of future conflicts; mobility in deliberately planned and non-deliberately planned situations; and existing USAF guidance for mobilization.

Chapter III addresses the methodology of the thesis and consists of two parts. The first part is a systematic approach to building a model of the basic mobilization process. The second part is explanation of the Delphi technique, including two survey questionnaires. The Delphi technique is used to build consensus on the validity of the model from experts in field of unit-level mobilization.

Chapter IV discusses the survey findings and analyzes the survey results. Chapter V draws conclusions for the study and makes appropriate recommendations.

Five appendices are attached to this thesis. Appendix A is a thought piece which uses the Theory of Constraints to focus on improvement of the mobilization process. Appendix B is the text of the Delphi questionnaires. Appendix C is a list of questionnaire recipients. Appendix D defines terms

used in the thesis. Appendix E is a comprehensive summary of the data collected through the Delphi questionnaires, including comments made by respondents.

II: Literature Review

Overview

This chapter examines background information on intra-theater mobility. The value of intra-theater mobility as recognized by military doctrine is reviewed. This value is illustrated with historical examples.

The case of the SCUD missile threat during the Gulf War is examined to demonstrate intra-theater mobility as a factor in modern warfighting. The chapter examines the impact of the end of the Cold War. With future conflicts likely to be very unpredictable in timing, location, and foe, intra-theater mobility will continue to be relevant.

Examples of actual intra-theater moves illustrate how moves can be made under a variety of conditions, some of which are significantly different than strategic unit-level mobilizations from home base.

A review of the existing guidance for mobility is included, focusing on the adequacy of guidance for intra-theater mobilization.

The Value of Mobility

The Department of Defense defines mobility as:

a quality or capability of military forces which permits them to move from place to place while retaining the ability to fulfill their primary mission.
(27:237)

The USAF asserts that:

mobility is a mission essential program supporting national objectives during wartime or [during] contingency operations and must be afforded sufficient command emphasis to ensure national readiness. (15:5)

Both statements establish mobility as a necessary part of military capabilities. The ability to move is affirmed as a significant command concern.

Doctrine. The most basic explanation of the role of mobility in the USAF comes from Basic Aerospace Doctrine of the United States Air Force, AFM 1-1, which is a document that provides "the broad conceptual basis for our understanding of war, human nature, and aerospace power" (7:vii). Mobility is characterized as a core combat skill for aerospace forces. As a combat capability, mobility is explained as follows: "One of the most important characteristics of aerospace forces has proved to be their ability to move anywhere in the world quickly and then rapidly begin operations" (7:200).

The ability to put combat units where they are needed when they are needed is essential to successful military operations. As a conflict evolves, theater commanders may see an opportunity to employ the principle of maneuver by moving and concentrating forces in order to exploit enemy weaknesses (8:80-83). Intra-theater mobility is an important supporting capability. Without a mobility system that can move forces effectively, the opportunity to gain the upper hand in battle could be lost.

Restated another way, mobility, as part of the process of movement from point-of-origin to point-of-use, provides the organic ability for time and place utility (23:6, 37:171). Place utility is the value added to forces when made available for use in the right place. Time utility is the value added by making forces available at the right time (37:10-11).

AFM 1-10, Combat Support Doctrine, also recognizes mobility as a key element in military operations. This doctrine includes mobility under the broader process of distribution, which also includes non-unit movements such as regularly scheduled transportation and resupply. The distribution process is described as "vital to combat operations and...an essential task of combat support" (9:2-3). The manual identifies movement as an element of distribution, and the mobilization procedures of preparation, marshalling, and loading of people and equipment as a part of movement (9:2-3).

Historic Examples. The value of intra-theater mobility for air forces has been demonstrated in past conflicts. The second world war, because of its length and geographic scale, provides many examples of operational necessity forcing intra-theater unit movement.

Movement Forward with Battle. Intra-theater mobility can be useful in improving close-air support. British successes in North Africa were due in part to unprecedented Royal Air Force support. General Montgomery's

drive to El Alamein marked the first campaign in which a British Army had been covered by a mobile tactical air force. The air arm was organized to "leap-frog squadrons up and down the battlefield so that troops could have continuous air cover" (26:111-112). The result was defeat for Rommel and his Afrika Corps.

A more powerful example of improved close-air support is the movement of tactical air forces during the Normandy invasion. During the massive invasion, the Allies moved sixteen divisions of ground forces ashore in five days. Air power was also moved onto the continent as rapidly as possible.

As the invasion air force for the Americans, the Ninth [Air Force] went all out to move its combat units, especially the fighters, across the Channel to Normandy. ...an emergency airstrip was completed on D-Day...the fighter-bombers were on hand for the great sweep across France to the German border during August and September. (39:69)

Fighter squadrons were operating out of Normandy within a week of D-Day, and seventeen fighter-bomber groups were operating in France within seven weeks (39:69). On top of this massive move onto the continent, the aggressive movement forward of tactical air forces contributed to the speed of the advance toward Germany by providing continuous air cover for friendly ground forces and the pressure of air attacks on enemy forces. These tactical air forces advanced between 400 and 500 miles in seven weeks, operating out of numerous bases along the way. The impact of the fighter-bombers was potent, in one case credited with forcing,

without the support of Allied ground forces, a retreating column of 20,000 German troops to surrender (39:69-70).

In some cases, interdiction and strikes at strategic targets were also made possible by the mobility of air units. As the Allies moved closer to Germany, moving the fighter-bombers forward allowed them to target enemy airfields, depots, and supply trains previously reachable only by longer range bombers. This accelerated the ruin of enemy forces, the *Luftwaffe* in particular (26:125).

Forward Operating Locations. In preparation for the 1943 invasion of Sicily, the Allies seized the island of Pantelleria and established a fighter base. Squadrons operating from this base had the range to fly over hostile installations on Sicily, and managed to destroy most of thirty one German airfields and about 1,000 enemy aircraft before the ground assault began. The ability to quickly exploit the base on Pantelleria Island depended on the capability of the Allies to mobilize and transport operational fighter units to the island (39:61-63).

The Prussian military theorist Carl von Clausewitz said "One of the strongest weapons of offensive warfare is the surprise attack...It is the most important element of victory" (4:19). In 1941, the *Luftwaffe* took advantages of intra-theater mobility to gain strategic and tactical surprise in the *blitzkrieg* invasion of the Soviet Union. The lightning fast and unexpected invasion was made possible in part by rapidly and covertly shifting forces from other

parts of the theater just prior to the attack. Many of the squadrons participating in the opening offensive had been operating, sometimes as recently as a few days earlier, against Britain or in the Balkans or Crete. The ability to mobilize allowed the Germans to move forces intra-theater quickly from operating locations in the Balkans and Crete and attack before the movements were detected. The attack was so devastating that *Luftwaffe* estimates of Soviet aircraft losses in the first week were over 4900, while the Germans lost 179 (33:21-42).

Tactical Withdrawal. The ability to withdraw from operating bases also has proved its merit. In the opening days of the Battle of Britain, the RAF pulled units out of forward bases deemed too vulnerable to enemy attack. Removing these forces from possible destruction and allowing them to rest and reconstitute gave the Royal Air Force an edge in the ensuing air battle with the German air force. The Battle of Britain was a close contest and the *Luftwaffe* could have won. Instead, the Royal Air Force won and the invasion of Britain abandoned (26:119-121).

These examples show only some of the ways intra-theater mobility has contributed to the prosecution of theater objectives. More recent examples also exist.

Mobility in the Gulf War. Airpower was a decisive combat element in the Gulf War. Forty days of air operations set the stage for a ground offensive that shattered Iraqi defenses and drove them out of Kuwait in

less than 100 hours. Air Force Chief of Staff General Merrill A. McPeak has stated that air power defeated the Iraqi Army (5:17). Airlift provided a large part of that element, so much so that one analyst of military strategy claims:

...there is no question that the massive USAF deployments constituted the single greatest advantage over Iraq. The crisis provided an unequalled demonstration of the USAF's unequalled strategic mobility...(34:64)

Theater transportation, land, sea, and air, also performed prodigious feats (17:73). Theater airlifters flew on average more than 100 flights daily in support of all the services (17:73), totaling the movement of over 142,000 short tons of cargo and 134,000 passengers (18:78). Much of this effort was scheduled traffic, but also included intra-theater mobility unit movements (8:194, 41:16-29 Feb 91).

Units mobilized unexpectedly on short notice, primarily for combat reasons (41:20-29 Jan 91). For instance, the movement of a squadron of F-16Cs to an airfield closer to Iraq in order to improve aircraft response time to SCUD missile sightings. The mobile SCUD missile launchers "posed one of the air campaign's most serious challenges..." (13:24). F-16s in their air-to-ground role were one of the weapon systems used to find and destroy the mobile missile launchers. The threat that SCUDs posed as weapons of terror was not wholly anticipated and, despite the massive air and air defense campaign against them, the SCUDs managed to

inflict 25% of America's casualties (8:143, 13:24-26). The importance of moving forces quickly to forward operating bases to provide improved response to the SCUD threat was clearly shown, and can be translated into "lives, time, and resources saved (14:11).

The best operating location for air forces can change quickly as a conflict progresses. This means that although forces may initially deploy into an optimal location, the nature of the conflict may change so that a different location becomes a preferred operating base later in time.

F-16Cs originally intended for strikes on strategic targets and for interdiction could, at the outset of the conflict, be based relatively far from the target areas and still operate effectively. The speed of response to target sightings was not considered critical, largely because the targets were not mobile. So these forces were based further from the front to avoid overcrowding forward bases.

Realization of the SCUD threat changed that assessment. Forces suddenly became much more valuable in the forward locations, overcrowding or not, because from those forward bases they could react quickly to destroy the SCUD missile launchers.

Future Conflicts

The nature of future threats may make them more unpredictable. With the Cold War over, military planners do not have the luxury of knowing whom to prepare to fight

against and where that fight will most likely be. Instead of concentrating on preparation for a Soviet invasion of Europe or conflict in Korea, the USAF must be prepared to respond to a multitude of possible regional conflicts (5:30, 30:4-6).

Planners will be less able to assess threats accurately (5:30). With the imperfect assessment of threats comes a decreased likelihood of initially placing combat forces in the best locations within a theater.

Whether preparedness in the Gulf War for unit theater movement was high or low, the advantages of excellent facilities and ample time for base set-up and shake-down allowed commanders to reposition forces through deliberately planned moves. An exception is the unplanned moves of units to hunt SCUDs.

These advantages may not be present in the next conflict. The Chief of the USCENTCOM Mobility Division noted that "deep harbors, huge storage and staging areas, numerous airfields and Saudi cooperation made a significant difference in the ability to support logistical requirements" (17:72). The next conflict may be in a place less hospitable in terms of time and infrastructure.

Recognizing an increased potential for conflict in an unanticipated part of the third world, General Loh, while Commander of Tactical Air Command, said, "poor infrastructure will induce malpositioning of air superiority forces in theater" (29:12). The capability for intra-

theater mobility adds the flexibility a theater commander needs to realign forces as threats or opportunities become more apparent.

Types of Intra-theater Mobility

Several kinds of intra-theater mobility can be identified by considering the conditions under which different intra-theater moves are made. One kind is deliberately planned and managed essentially the same as an inter-theater strategic move from home base. This move may be the initial deployment from a home base already within a theater or a managed move, where time and resources for planning are abundantly available, to a better operating site.

Another possibility for an intra-theater move is one meant to exploit "the often fleeting opportunities that result from combat" (7:10). This is when an intra-theater move is significantly different from a deliberately planned strategic move, especially in that time and other resources for the planning and execution of a move are not as plentiful as in a deliberately planned situation.

Mobilization within a theater is subject to operations with a smaller resource base, shorter lead times for planning, and more vulnerability to the unexpected. For instance, many of the mobility experts, and much of the support equipment and automated systems such as mainframe computers remain at the home base after a strategic (inter-

theater) move so they can continue to support movement of additional units, replacements, and supplies. This means that units already deployed from home station must mobilize for follow-on moves without the support of these resources.

Shorter planning lead times and the impact of the unexpected were illustrated in some of the historical examples given: moving forces offensively to counter the SCUDs had to be quick and thorough to be effective. USAF doctrine notes that "speed and flexibility are required if forces are to cope with the unexpected in modern, fast-paced warfare" (7:17). This can include shifts in the battle area itself. As shown in the Allied drive toward Germany in the second world war, forces must be prepared to move forward as the battle area moves.

An alternative to moving to bases closer to the target area is extending the range of aircraft with in-flight refueling by aerial tanker aircraft. This alternative has costs. In the Gulf War dependence on tankers to maximize bomb loads (by reducing initial fuel load) and to extend range to reach more distant targets became a weak link in the air war. Each day an average of 80,000 tons of aviation fuel was used to deliver 2,000 tons of bombs. Bombers refueled on both the inbound and outbound legs of sorties. Enough tankers were not available to support demand for refueling (16:164-165). Moving forces to forward operating locations to take advantage of specific opportunities can shorten the travel time to targets and reduce dependence on

tanker availability. However, mobilization response must be timely to respond to any window of opportunity presented (41:20-29 Jan 91).

Although some intra-theater moves may have the time and other resources available for a deliberately planned move, other intra-theater moves must be made under conditions that afford much less time for planning and relatively fewer supporting resources. Examples of moves made in response to changing combat conditions include movement forward with the battle area, moves to forward operating locations, and withdrawals from threats to the air base. These are also all examples of time and resource constrained moves.

Review of Existing Guidance for Mobility

Given the different types of intra-theater mobilization, this section examines the existing guidance on mobilization. The central document for mobility policy and procedures is AFR 28-4, USAF Mobility Planning. AFR 28-4 outlines responsibility and specific procedures for mobilization by functional area, e.g. transportation, personnel, plans, and squadron commanders. The primary responsibility is placed on wing commanders and, acting for the commanders, logistics plans officers and non-commissioned officers. The regulation addresses mobilization in general but in effect only addresses mobility that is deliberately planned. AFR 28-4 does not differentiate procedures for moves that are not deliberately

planned or provide any guidance on how to plan and execute those kinds of moves.

UTCs and COMPES. An example of the orientation of AFR 28-4 on deliberate planning is the focus on Unit Type Code (UTC) management and the Contingency Operations Management and Execution System (COMPES) for planning mobilization.

UTCs are codes that categorize unit and sub-unit level organizations and capabilities by type, for example a squadron of F-16C fighters would be given one UTC (3FKJB) that it shares with other squadrons of F-16Cs with the same organization and mission (32:339). Examples of smaller UTCs are a Security Police Air Base Ground Defense Flight (QFEB2), a Munitions Maintenance Element (HGHAC), a Fuel Truck (JFDEB), a 10,000 gallon Fuel Bladder (XFBF1), and a Traffic Management Supervisor (UFTSU). UTCs are building blocks that planners use to construct a forward deployed operation base. A deployed operating base requires hundreds of UTCs (41:16-23 Feb 91).

COMPES is the automated database used to maintain and distribute the detailed personnel and equipment information that makes up UTCs. This system produces the documents that guide units in building combat deployment packages, producing load and packing lists, and matching manpower requirements with available personnel (15:27).

A number of problems arise when UTCs and COMPES are considered for supporting an intra-theater move. COMPES requires automated systems that are not presently

deployable. A unit removed from its home station may not have access to automated UTC information for guiding them on further movements. Even if the automated support did exist within a theater the suitability of UTCs and COMPES for intra-theater mobilization, with its relatively restrictive time and resource constraints, has not been established.

AFR 28-4 does not differentiate between management of a move using COMPES and UTCs from a move without the benefits of COMPES and UTCs. AFR 28-4 also does not address follow-on moves after initial deployment from home base.

Deployable Automated Systems. Some deployable systems exist, notably for loadplanning (Computer Automated Load Manifesting or CALM) and the personnel side of COMPES (Combat Personnel Computer System or CPCS). Others are in development for the equipment side of COMPES (stand-alone Logistics Module/Base or stand-alone LOGMOD-B), but how these automated systems are to be used in the field has not been addressed. The usefulness of automated systems can be evaluated only on their ability to support the objectives of operational and tactical mobility. Regulations and manuals address neither the objectives of intra-theater mobility or the suitability of automated tools.

Other Relevant Documents. AFR 28-4 is the core USAF document for mobility, but other documents do contain some policy and guidance on mobilization procedures. Most of these documents do not, however, address intra-theater mobilization. Base level plans, for example, are written

using a format specified by AFR 28-4, and are meant to expand on AFR 28-4 with details needed to account for unique base-level situations. AFR 400-25, Logistics Plans Management, describes mobility as one of the responsibilities of a logistics plans and programs officer or NCO, but also does not address the intra-theater mobilization role.

Only one document was found that addresses the issue of intra-theater mobilization. The short paper Definition of the Employment Role of Logistics Planners addresses theater activity directly by saying that logistics planners will:

coordinate the requirements and prepare plans and schedules of events for any follow-on unit moves or redeployment to home station. Follow-on unit deployments will follow standard mobility procedures ... (20:5) [Emphasis Added]

This statement implies that deliberately planned mobility procedures outlined in AFR 28-4 are applicable to intra-theater mobility, and does not recognize that the tools required (COMPES/UTCs, etc.) may not be available and may not be applicable to an intra-theater move, or that an intra-theater move may need to operate under different conditions.

One other regulation, Movement of Units in Air Force Aircraft, AFR 76-6, provides some limited insight. This document does not describe intra-theater mobility processes or organization, but does describe some of the expected outputs of the intra-theater mobility process. Preparatory actions for movement on transport aircraft are outlined:

The unit (or organization responsible for its deployment) will prepare itself for airlift; certify hazardous cargo; and provide load plans. Cargo preparation includes weighing, marking, measuring, palletizing (when required), securing and manifesting cargo, as well as computing center of gravity (CG) when appropriate. The unit will also provide load teams to load, off-load, and secure cargo to the aircraft, and will furnish any required shoring, dunnage, materials handling equipment/cargo handling equipment (MHE/CHE), and vehicle operators, as well as operate [Mobility Control Centers]. (12:1-1)

Units are tasked with the responsibility for preparing their own equipment for transport, planning for the allocation of equipment to available transports (load planning), and loading of unit assets onto transports. These tasks are prerequisites for transportation and are part of the mobilization process, but do not represent the whole mobilization process, or provide guidance to units on how to mobilize. In other words, this Air Force transportation regulation shows that units are expected to have the procedures and tools necessary to prepare for movement. The transporters expect outputs, but do not prescribe the process of arriving at those outputs.

Chapter Summary

This review demonstrated that while the mobility of air force units within a theater of operations is an important military concern, USAF policy and guidance below the doctrinal level is inadequate.

Intra-theater mobility has been shown, in some situations, as different than strategic mobility. Some

intra-theater moves, such as movement forward with the battle area; movement to a forward operating location; and retreats or withdrawals because of threats to the air base, are not deliberately planned and face more severe time and resource constraints than do inter-theater moves. Guidance that recognizes these differences and contains procedures for the actions a unit must perform during an intra-theater move was not found. In existing guidance, unit level procedures for intra-theater mobilization is not differentiated from deliberately planned guidance for mobilization.

III: Methodology

Overview

This chapter is divided into two distinct sections. The first section focuses on constructing a model of an intra-theater mobilization system. Systems analysis is used to define the essential goals of mobilization. Once the purpose of mobilization is established as a means to improved operations, the model is used to show how mobilization is potentially a constraint on operations. The mobilization process itself is then broken down into component parts so that the essential actions required for intra-theater mobilization are defined.

The second section is concerned with use of the Delphi technique to validate the model. The Delphi technique is a qualitative approach that uses a series of questionnaires to develop a consensus of expert opinion. The questionnaires ask the experts to validate the essential tasks and to rate existing mobility tools on their capacity to accomplish the essential goals defined in the model.

The System Model

The reason for building a model of the intra-theater mobilization system is so that the purpose and goals of intra-theater mobilization are made clear. Defining exactly how mobility contributes to the success of military

operations is an important prerequisite to developing procedures or plans of action. The management theorist Eliyahu Goldratt put this need into perspective in The Haystack Syndrome: Sifting Information out of the Data Ocean:

Every organization is built to achieve a purpose. Thus, whenever we debate any action in any section of any organization, the only way to hold a logical discussion is by judging the impact of the action on the overall purpose of the organization. (21:10)

Looking at intra-theater mobilization as a system that contributes to the success of larger objectives is an important step to understanding how intra-theater mobility should work. In the USAF, that larger objective is the application of air power (8:79-84).

The previous chapter showed that intra-theater mobility is important to military success. However, unit-level procedural guidance for an intra-theater move is minimal or does not exist. This study focuses on unit responsibilities within the intra-theater mobility framework. In this context, intra-theater mobility is meant to refer to unit-level mobilization, as opposed to, for instance, setting up a theater-wide transportation network.

Before procedures for intra-theater mobilization can be developed, the goals of intra-theater mobilization must first be clearly defined. Unit-level procedures can then be developed and judged on how well they meet those goals.

By building a conceptual model of the intra-theater mobility system, the purpose, goals, and basic processes of

intra-theater mobility can be described. This description of what must be done is a prerequisite to deciding how it must be done (40:15-16).

General Systems Theory. The value of the systems approach stems largely from its ability to describe dynamic organizations. Figure 1 lists some of the important characteristics of the systems approach. Using the concepts of a hierarchy of systems (systems within systems), systems constructed of components, and input-transformation-output modeling, intra-theater mobility can be analyzed as a system within a larger environment and can also be broken down into smaller components.

Key Concepts of Systems Theory

Hierarchy: A basic concept in systems thinking is that of hierarchical relationships between systems. A system is composed of subsystems of a lower order and is also part of a suprasystem. Thus, there is a hierarchy of the components of the system.

Subsystems or Components: A system by definition is composed of interrelated parts or elements. This is true for all systems-mechanical, biological, or social. Every system has at least two elements, and these elements are interconnected.

Input-Transformation-Output Model: The open system can be viewed as a transformation model. In a dynamic relationship with its environment, it receives various inputs, transforms these inputs in some way, and exports outputs.

Figure 1. Key Concepts of Systems Theory (29:65-66)

The application of General Systems Theory to the intra-theater mobilization process, using an input-transformation-output model, is considered next.

Inputs-Transformation-Outputs. Any attempt to use General Systems Theory to place unit-level mobilization into a larger environment must be based on an input-transformation-output model, with mobilization, since it is the focus of interest, as the transformation. Figure 2 illustrates such a model.

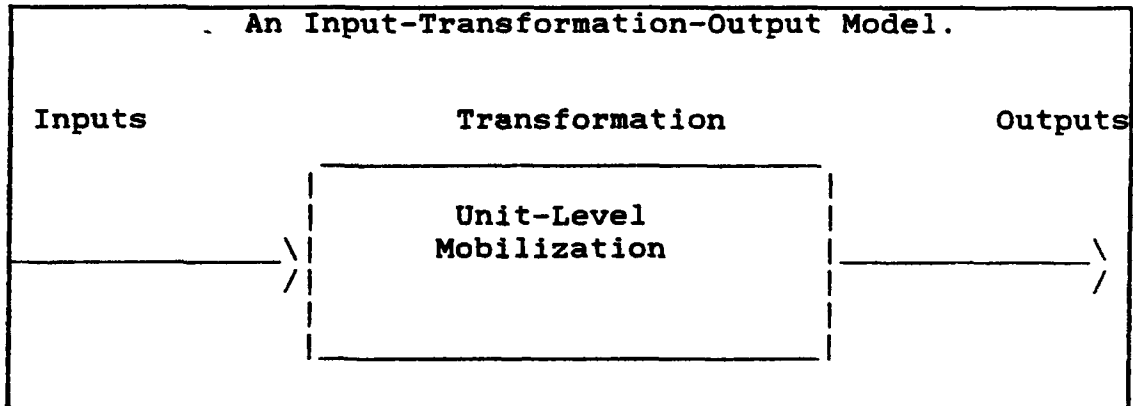


Figure 2. An Input-Transformation-Output Model

If mobilization is the transformation, what are the inputs and outputs? Basic USAF doctrine characterizes mobility as the capability to move operating forces "anywhere in the world quickly and rapidly begin operations." (8:200). Mobilization, as a subset of mobility, prepares (transforms) operating forces for movement. The input to the intra-theater mobilization process is therefore operating combat forces.

The outputs are not as simple to identify. According to doctrine, the result of mobility is combat air power that has been moved to a new location. This implies a model where the input is an operating unit, the output is an operating unit at a new location, and the transformation in

between is movement. Figure 3 shows a model where operations at a new location is the result of the movement.

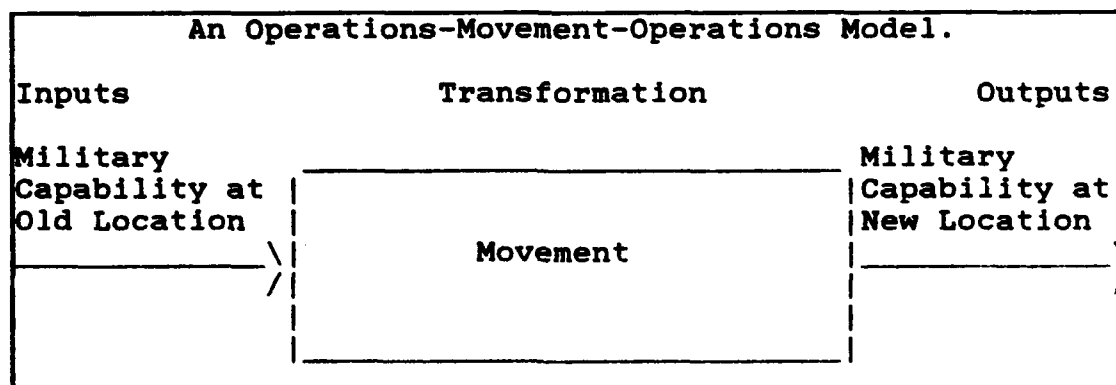


Figure 3. An Operations-Movement-Operations Model

Movement in this context is synonymous with mobility, but is not synonymous with unit-level mobilization, because mobilization is only the preparation for the actual move. Movement implies both unit-level mobilization and transportation. Isolating the output that mobilization contributes to requires looking at transportation and mobilization as two elements within a larger movement mode.

Mobilization and Transportation. Transportation refers to the physical movement of personnel and equipment from one place to another. Mobilization prepares forces to move as cohesive and useful entities, implying that these forces have been built for both transportability and operability. Mobilization is therefore a prerequisite to physical movement. Using the input-transformation-output analogy, mobilization transforms an operating unit into one that is being transported. The output of mobilization is therefore combat forces that are ready for transport.

Mobilization as a Subsystem. Figure 4 illustrates the flow from operations mode to movement mode and back again to operations mode as a unit moves from one location to another. In this representation the movement mode consists of everything between the two operations modes, and is broken down into three parts: mobilization, transportation, and beddown. Within the movement mode transportation itself is the responsibility of the carrier, often an external organization, while the conversion of a unit from operations to movement mode (mobilization) and back again from movement to operations mode (beddown) are unit-level responsibilities.

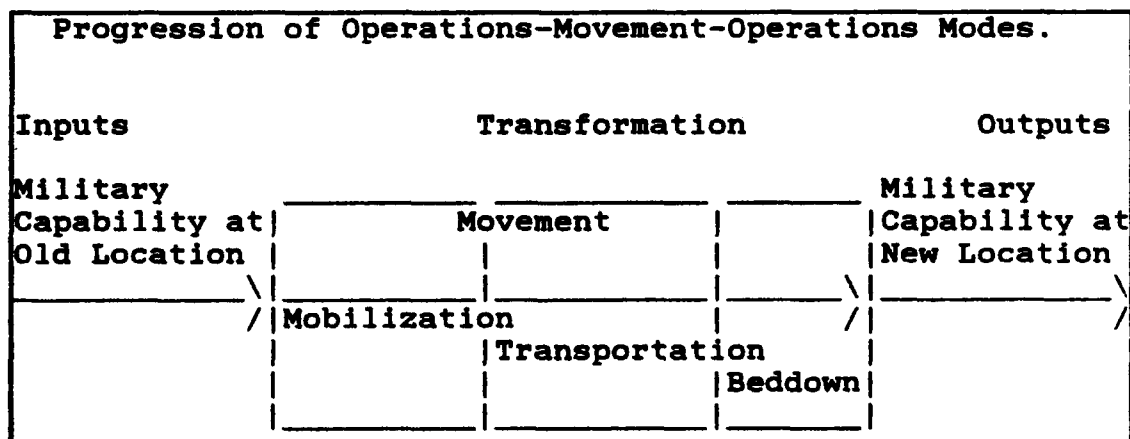


Figure 4. Progression of Operations-Movement-Operations Modes

The focus of this study is on the mobilization process. Figure 5 isolates mobilization as a system within the larger environment.

The Objective of Mobilization. While the immediate output of mobilization is to convert an operating unit into a unit ready for transportation, the primary objective of

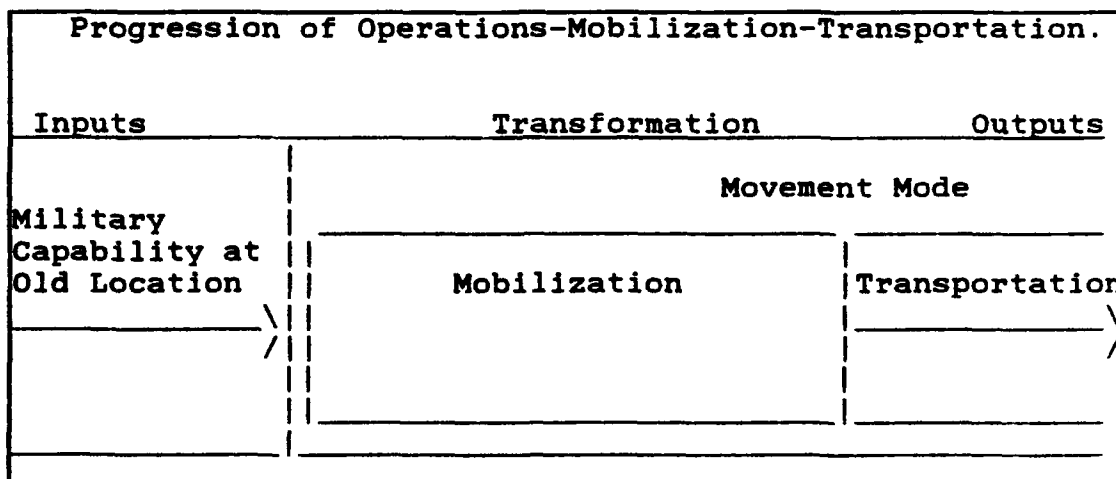


Figure 5. Progression of Operations-Mobilization-Transportation

mobilization is more far-reaching. The objective of mobilization is tied to the objective of transportation, beddown, and the objective of the larger concept of movement of forces that includes mobilization, transportation, and beddown. That goal is to allow combat forces to operate in new locations. Operations, or the potential for operations, is the way military forces achieve their objective, which is to force the enemy to do their will (7:1). The movement mode of mobilization, transportation, and beddown combined should facilitate the operational capability of forces.

Mobilization should facilitate operations by transforming units for transport, and particularly should be able to transform units quickly and in a way that preserves unit operational integrity. Two passages on organizational structure, from USAF basic doctrine, illustrate this point. The first passage says "speed and flexibility are required if forces are to cope with the unexpected in modern, fast-

paced warfare" (7:17). This implies that time is a critical fitness-for-use parameter, and that the quality of a mobilization (transforming a unit for transportation) can be rated by whether it is fast enough or not fast enough (28:328). Mobilization should minimize the time a unit loses when it shifts from operations to movement and then back to operations (14:13).

The second passage says "survivable forces must be able to sustain the fight with the proper balance of people, concepts, and equipment" (7:17). Thus mobility should prepare forces to move so that the composition and sequencing of people and equipment preserves unit operational capability as much as possible. An example of a failure to preserve operational integrity would moving a flight of aircraft to a new operating base without moving in the maintenance specialists, stocks of spare parts, support equipment, and fuel supplies needed to keep those aircraft flying.

The purpose of mobilization is, put simply, to preserve unit operational integrity as much as possible while facilitating unit conversion from operations mode to transportation mode and to do this within time limits.

Mobilization as a Constraint on Operations

This section uses the Theory of Constraints (TOC) to place the mobilization process within the larger military system, and shows how mobilization can be a constraint on

operations. TOC is a process of ongoing improvement within a system or organization. It is based on the premise that "every system is built for a purpose" (22:4).

TOC defines a constraint as "any element that prevents the system from achieving the goal" of the organization (37:81). The goal of military forces in war is to "compel the adversary to do our will" (7:1). If unit-level mobilization is not quick enough or comprehensive enough to prepare a unit for transport when a wartime window of opportunity is presented, mobilization will have become a constraint on operations. Inadequate mobilization capability can prevent an organization from achieving its goal.

If mobilization is identified as a constraint, the next step is to manage the constraint to its utmost capacity. This requires a better understanding of the nature of mobilization and the basic tasks involved in unit level mobilization.

Further Application. Applying TOC further results in some suggestions for the improved management of the mobilization process, such as the early release of mobilization planning tasks. This application is beyond the stated focus of the thesis. That focus is to describe, as a prerequisite to identifying management techniques, the basic tasks of intra-theater mobilization. Appendix A applies the Theory of Constraints to the mobilization process and considers techniques for improved management.

The Essential Tasks of Intra-Theater Mobility

The next step is to identify the basic tasks of intra-theater mobilization. These steps can be deduced by looking at two requirements: what a unit needs to do to remain operational and what a unit must do to become transportable.

In order to remain operational a unit must know what it must be able to do (mission statement), know what assets are needed to do the job (identify manpower and equipment requirements), and be able to acquire the necessary personnel and equipment (sourcing required assets).

In order to become transportable a unit must be able to transform those people and equipment into transportable form. This includes the tasks extracted from AFR 76-6, mentioned in Chapter III, which include allocating assets among available transport vehicles, physical preparation of people and equipment for transportation, and the loading of assets onto the transport vehicles.

Looking at these essential tasks as a sequence of dependent events, two other basic tasks are made apparent and a model of the mobilization process can be derived.

Dependent Events. The tasks of mobilization are sequential and dependent. Dependent events can be defined as "operations or activities [that] cannot take place until certain other operations or activities occur" (38:52). This is the case in the mobilization process. A mission statement is a prerequisite to identification and sourcing of the required personnel and equipment. Once assets are

identified and sourced they must be prioritized and sequenced before they can be allocated to transport vehicles. This is to ensure that critical assets are moved before redundancies or trivialities. Figure 6 shows a policy chart used at an airbase in the Middle East during Desert Storm to prioritize cargo on a daily airlift shuttle between a rear base and a forward-deployed squadron. This chart is a sample approach to sequencing and prioritizing for movement.

C-130 Shuttle	
Sequence of Cargo Priority	
Al Minhad AB, January 1991	
<hr/>	
1.	Passengers & baggage
2.	Maintenance equipment & supply parts
3.	Mail
4.	Other:beds, water, unaccompanied personal items, back-up equipment, spare vehicles

Figure 6. C-130 Shuttle Sequence of Cargo Priority (6:1)

Official lessons learned from the Gulf War recognize the importance of mobility sequencing: "For example at a bare base, the housekeeping facilities were not set up and people were arriving unannounced. This placed a great burden on already extreme circumstances" (24:4). Appropriate sequencing would have delivered the housekeeping facilities needed to support the base population prior to the arrival of those forces.

Preparation of personnel and equipment are not dependent on prioritization, sequencing, or allocation, but

can start after required assets have been identified and sourced. This means that once the assets needed have been identified for deployment the process can proceed along two lines; both physical preparation and prioritization can begin. Only when assets have been both prepared for transportation and allocated to specific types of transport vehicles can they be marshalled (staged) for loading. The flowchart model in Figure 7 is a representation of this sequence of events.

Validation of the Model

The chapter up to this point has led up to a model that describes the most essential tasks of an intra-theater unit-level mobilization. This description, along with the description of the tools best suited to perform those tasks, is the focus of the thesis. The next steps are validation of the accuracy of the model and enumeration of the tools that are perceived to be best suited to accomplishing the essential tasks. These steps are effected through a consensus of opinion among experts in the field of mobility. The Delphi technique is used in this thesis to obtain the consensus.

The Delphi Technique

The Delphi is a technique for building a consensus of opinion among experts in a particular area of interest. It was originally developed at the RAND corporation in the

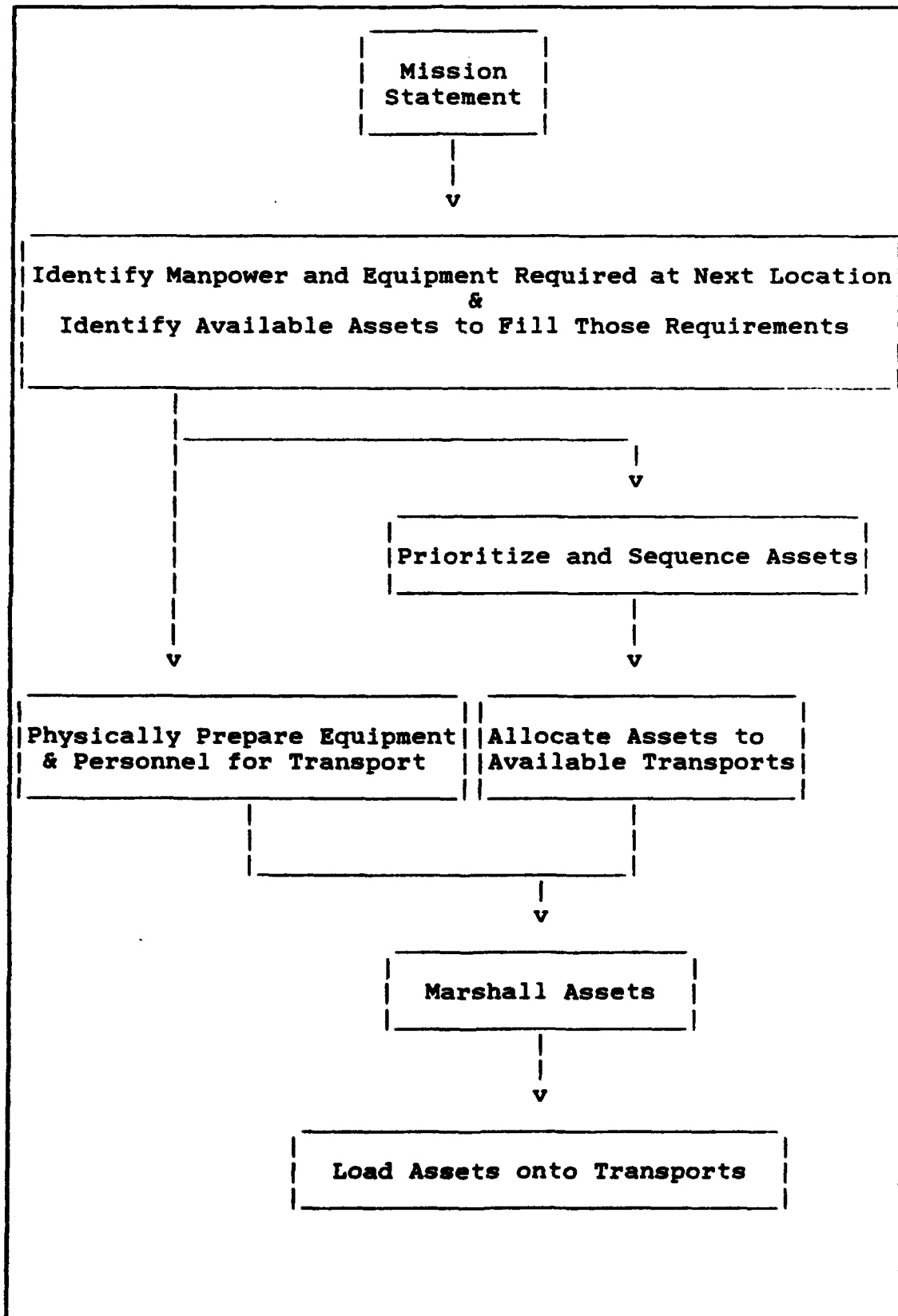


Figure 7. The Basic Model

1950s as a means to eliminating "many of the negative effects related to the use of interacting groups for decision making" (36:89). The intent was to gather the opinions of experts that were uncorrupted by "high-status participants or strong personalities" (36:89) and so were more representative of the experts true, objective opinions. Since then the value of the Delphi technique in gathering the opinion of experts who cannot physically come together has been recognized (36:90).

Walter E. Riggs, in his article The Delphi Technique: An Experimental Evaluation, provides a straightforward description of the process. This is shown in Figure 8.

The Experts. Since the problem has already been defined in chapter one, the next stage of the Delphi process is to select the experts to be polled. Determining who is an expert can be done in a number of ways, including discrimination through the use of educational credentials or past accomplishments (3:140). For this thesis the logical approach was to choose individuals who have experience and professional credentials in the field of unit-level mobilization. Air Force Regulation 400-25, Logistics Plans and Programs, identifies the Wing Resource Plans office, or its equivalent, as the office responsible for base-level mobility (11:11-13). According to this regulation the Chiefs of Resource Plans, or their equivalents at base-level, were responsible for mobilization and so were chosen as the experts for this study.

The First Questionnaire

A questionnaire was developed to solicit the opinions of the mobilization experts. The full text of this questionnaire, along with the text of the second questionnaire, is contained in Appendix B. Each questionnaire consists of three parts: background information, the basic intra-theater mobility process, and mobility tools.

Background Information. This focused on the information needed for classification and analysis (18: 355).

Questions (2) and (4), concerning job title and mobility as part of the job, were included as a measure of how successful the survey was in reaching the target population, the mobilization experts: these questions focused on job title and the importance of mobility as a part of the respondent's job.

Questions (1), (3), (5), (6), and (7), concerning major command (MAJCOM) affiliation, grade, years of experience in mobility, experience with intra-theater mobility, and perceptions of typical unit readiness for intra-theater mobility respectively, were included as discriminators. For instance, this would allow analysis of whether opinions differ significantly between groups with different levels of experience?

Questions About the Process. This section addresses most of the investigative questions presented in chapter

A Flowchart of the Typical Delphi Process

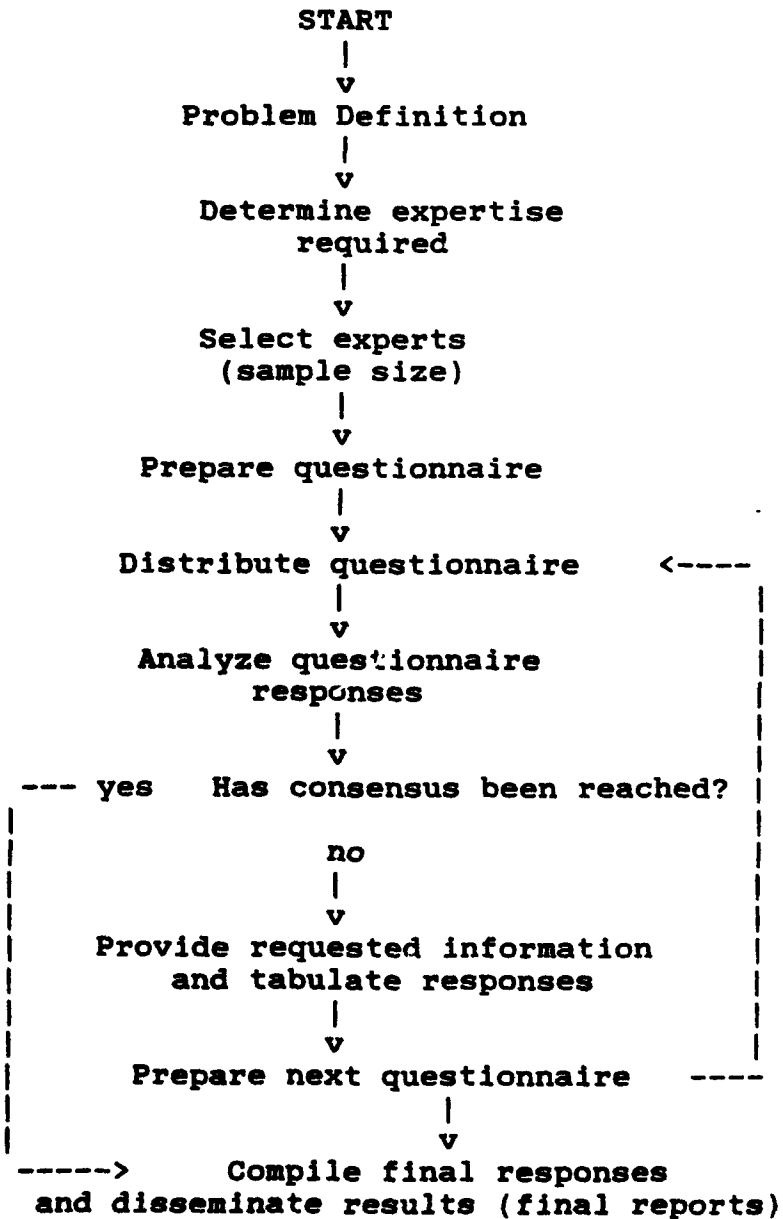


Figure 8. A Flowchart of the Typical Delphi Process
(35:90)

one. The information derived from these questions can be considered part of the target data of the thesis (18:355).

Questions (9) and (14) address the first investigative question and are designed to determine whether the experts perceive intra-theater mobility as different than inter-theater mobility. The justification behind these questions is that if intra and inter-theater mobilization are different, the best tools and procedures for each kind of mobilization may also be different.

Questions (12) and (13) address the second investigative question and were used to determine whether the basic elements of mobilization included in the model were perceived as valid elements of intra-theater mobilization.

Questions (10) and (11) address the third investigative question and were aimed at determining whether the experts accepted the sequential, integral system model of mobilization (Figure 7). These questions were meant to define any intrinsic organization or order in the mobilization process.

Questions (8) and (15) addressed the fourth investigative question and looked at attitudes toward the need for trained unit-level mobility personnel during an intra-theater move. These questions were meant to determine if the mobilization process is intuitive, and so could be taken for granted. If not, expertise in the process and procedures of mobilization is necessary for success, and

planning and organization become important mobilization considerations.

Mobility Tools. This segment addressed the fifth and sixth investigative questions. The tools or systems commonly in use for accomplishing each essential task for mobilization were listed and the experts were asked to rank order them from best to worst. Questions (16), (18), (20), (22), (24), (26), (28), and (30) each follow this approach for a distinct mobilization task identified in the mobilization model. Question (32) does the same for common techniques used to direct, coordinate, and control mobilization. Each of these questions was meant to determine whether an consensus of expert opinion on which tools are best exists.

Each of these questions was also followed by an open ended question asking whether existing tools are good enough for intra-theater mobility and if not, how they could be improved. Finally, the questionnaire is ended with an open-ended question for any additional comments on the mobilization process, tasks, and tools.

Question Construction. Questions aimed at collecting target data took three distinct forms. They were either open ended in nature, based on a Likert scale, or based on a straightforward ranking of options.

Open ended questions were included to capture expanded justifications for answers or unanticipated trends in opinion. Open ended questions are especially useful when

"advance knowledge of response options [are] not available" (19:457). Responses to the open ended questions can capture responses unanticipated in the more structured Likert scale and ranking questions.

Likert Scale. Questions using a Likert scale were designed to measure a range of opinion on a specific question. Options for answers range from highly disagree to highly agree or from very low to very high, depending on the

Likert Scales used in the Questionnaires.					
a.	b.	c.	d.	e.	
Highly Disagree	Disagree	Neither Nor Disagree	Agree	Highly Agree	

a.	b.	c.	d.	e.	f.
Very Low	Low	Slightly Low	Slightly High	High	Very High

Figure 9. Likert Scales used in the Questionnaires

question. Figure 9 exhibits the two scales used. The advantage of using a Likert scale rests in the ability to measure whether overall opinion on a specific question is positive or negative, favorable or unfavorable (19:219-220). Some arbitrariness exists in that one individual's highly agree may equate to another's agree. The differences in strength of response are qualitative. However, an agree and

a disagree are clearly distinct. In other words, a Likert scale allows for quantification of responses.

Questions using ranking are similar to those using a Likert scale in that they allow for responses to be quantified (19: 212-215). As such, consensus opinion can be more objectively identified.

Weighted Ranking Method. Certain questions asked respondents to rank order tools for mobilization. In order to illustrate how highly a particular tool was ranked overall relative to other tools in the same category, a weighting system was used to give a numerical score to each ranking. Figure 10 depicts the weighted ranking system.

Weighted Ranking System	
<u>Ranking</u>	<u>Weighted Score</u>
1st	1.000
2nd	0.500
3rd	0.333
4th	0.250
5th	0.200
6th	0.167
Not Ranked	0.000

Figure 10. Weighted Ranking System

Using this system, a tool ranked more highly overall received a higher numerical score overall. For example if a tool was ranked first by all 21 respondents it would receive an aggregate score of $21 \times 1.000 = 21$. If a tool was ranked second by all respondents its score would be $21 \times 0.500 = 10.5$. Weighted responses to survey questions are included in the questionnaire data listed in Appendix E.

Reliability. C. William Emory, in Business Research Methods, says "a measure is reliable to the degree that it supplies consistent results" (19:185). For this thesis reliability is determined primarily through observing the internal consistency of answers in the survey. Each investigative question was addressed by at least two distinct questions. If the questionnaire measures responses reliably, an individual expert's answer to one question on a specific subject should be consistent with that expert's answer to the parallel question on that subject (19:185-187). Reliability can be determined by how closely the answers to parallel questions correlate.

Validity. Emory defines validity as " the extent to which a test measures what we actually wish to measure" (18:180). Where reliability is the consistency of measurement, validity is the accuracy of measurement. A questionnaire must, among other things, be reliable in order to be valid (18:185).

To improve validity, draft questionnaires were pretested on experts from outside of the survey population. Seven AFIT graduate students who had previously been Chiefs or Assistant Chiefs of Resource Plans received draft questionnaires and were asked to evaluate them in terms of clarity, logic, comprehensiveness, and ease of execution. Six responses were returned, and the validity of the questionnaire was, for the most part, affirmed. Some changes, however, were suggested:

1. Two respondents felt that background questions addressing participation in Desert Storm/Desert Shield were not relevant to the survey. Considering the strong negative reaction to these questions from individuals who did not directly participate in the Gulf War, and the potential negative effects on questionnaire responses, these questions were deleted from the questionnaire.

2. Two other respondents recommended separating a question ranking tools for equipment and personnel preparation into two parts, since the tools used to prepare people are different than those used to prepare equipment. This was an accurate observation, and the question was separated into two parts.

3. Some corrections to sentence structure were suggested. These, for the most part, were improvements and were implemented.

4. One respondent was unsure whether a question (30) referred to actual loading or to load planning. Since the other respondents were able to determine that it referred to actual loading, the question was left as it was.

Overall, indications were that the questionnaire was straightforward and understandable by individuals with a background in unit-level mobilization.

Sample and Distribution

The 1988 Worldwide Logistics Plans and Programs Directory lists 206 USAF units that fit a certain criteria for inclusion in the survey: in size they are either groups

or wings (base-level) and are also subject to mobilization for deployment as units into a combat environment. Not included, for instance, were training wings, strategic missile wings, or headquarters elements. Included were fighter wings, bomber wings, reconnaissance wings, airlift wings, tactical control wings, and others.

This is the most recent published directory of resource plans offices in the USAF, but it overestimates the true number of units that fit the criteria. Between 1988 and the present, for example, the 3rd Tactical Fighter Wing, based at Clark Air Base in the Philippines, has ceased to exist.

Of the 206 units listed, fifty six were chosen at random as recipients of questionnaires. The random technique used was a stratified sample, in which every n th unit from a subgroup listing is selected (25:72-73). The subgroups in this sample consist of the following Major Commands (MAJCOMs): Air National Guard (ANG), Air Force Reserve (AFRES), Military Airlift Command (MAC), Pacific Air Forces (PACAF), Strategic Air Command (SAC), Tactical Air Command (TAC), and United State Air Forces Europe (USAFE). In the course of this study MAC converted to Air Mobility Command (AMC) while SAC and TAC combined into Air Combat Command (ACC).

Starting with an alphabetical listing of qualified units from each MAJCOM, every fourth unit was selected for the sample. A list of the units selected to receive the survey is presented in Appendix C.

The sample size of fifty six was selected to ensure a statistically adequate number of responses. With as little as a 20% response rate from a group of fifty six, evidence about the true median response of the entire population can be estimated at a high level of certainty. A nonparametric technique called the Sign Test, which makes no assumptions concerning the true underlying distribution of population opinion, can be used to estimate the median population opinion. For example, with as few as eleven responses, the true median opinion of the population can be statistically shown to be, with 95% confidence, above the midpoint on the Likert Scale if nine, ten, or eleven of the observations are above the midpoint. If the sample is truly a random sample of the population, this provides a high level of statistical certainty (31:949-952). Using the Sign Test, statistical inferences can be made about the median opinion of the population without making any assumptions concerning the probability distribution of those opinions.

Definition of Consensus

Consensus refers to a level of general agreement or accord within a group (41:300) and has been defined in previous Delphi studies as having at least two-thirds of respondents in agreement (3:146-147). Choosing 66.7% or higher agreement as the point of consensus is to a certain extent arbitrary, but does represent a high enough level of agreement to be considered a general agreement. Therefore,

for this thesis 66.7% or higher agreement on a particular Likert scale response is considered as a consensus.

The Second Questionnaire

A second questionnaire was constructed and sent to those who responded to the first questionnaire. This was done in an attempt to achieve a higher level of consensus by exposing respondents to the opinions of other experts.

Responses to the first questionnaire revealed a relatively limited level of consensus. Consensus on a single point on a given Likert scale, in the first questionnaire, was achieved in only four out of twelve questions. If the Likert scale questions are reduced to a binomial scale, the level of consensus is much higher. For instance, when responses are classified as either on the agree or disagree side of the scale or classified as on the high or low side of the scale, consensus is achieved in eleven out of twelve questions. For the questions addressing tools for mobilization tasks, the first questionnaire achieved consensus in the best tool for a task on one out of nine questions.

The second questionnaire was a reiteration of the first questionnaire, with three exceptions. First, responses from the first questionnaire were included. The percent of respondents choosing each answer on the Likert scales was listed, as was the percent of respondents ranking each mobility tool as the best for a particular mobilization

task. Further, for each question where comments were appropriate, the four most commonly made comments were summarized. Second, recipients were asked to reevaluate their answers after reviewing these responses from the first questionnaire. This is a key part of the Delphi technique: exposing experts to the inputs of other experts in the field in an effort to achieve consensus of opinion. Third, for the questions that asked respondents to rank tools, the choices OTHER and NO SYSTEM were dropped. In every ranking question on the first questionnaire these choices were rated lower than all the other alternatives, with OTHER consistently rated above NO SYSTEM. The text of the second questionnaire is contained in Appendix B.

Chapter Summary

The first part of the chapter showed mobilization as a link in the chain of events that allows units to change operating locations quickly and effectively. As a link, ineffective mobilization can constrain operational effectiveness.

Managing mobilization depends on understanding the basic elements of the mobilization process. A model of the interrelationship of these elements is presented.

The second part of the chapter concerns the use of expert opinion to validate the accuracy of the model and evaluate existing tools for intra-theater mobilization. The Delphi technique is explained, the population of

mobilization experts to be survey is defined, and the structure and content of the questionnaire is justified. The statistical aspects of sample size and sample distribution are discussed. A definition for consensus is outlined, and, finally, the reasoning behind the development of the second questionnaire is explained.

IV: Finding and Analysis

Overview

The purpose of this study was to answer the research question: What is the essential process of intra-theater mobilization? Six investigative questions were developed to lead to an answer to the research question. Answers to these investigative questions were found through the Literature Review and through the consensus opinions of a panel of mobility experts.

The Literature Review (Chapter II) established intra-theater mobilization as a valuable military capability which at times operates under more restricted conditions than inter-theater mobilization. The review also establishes that USAF guidance to the units specifically addressing these different mobilization conditions did not exist.

Consensus of expert opinion was developed using the Delphi technique, as discussed in Chapter III. Two rounds of questionnaires were sent to the panelists. In Chapter IV the findings of the Literature Review and the results of the questionnaires are considered and analyzed in the context of the investigative questions. In Chapter V these findings are used to answer the research question.

The full text of the first and the second questionnaire is contained in Appendix B. The text of the second questionnaire contains a summary of the results of the first questionnaire, while Appendix E is a comprehensive

collection of the data collected from the second questionnaire. This chapter presents the results of the questionnaires, including the percentage of response for each question alternative, acknowledgement of the consensus level reached, the weighted scores from the ranking questions, and comments made by the panelists.

Delphi Instrument Validity

The first iteration of the Delphi questionnaire was sent to fifty six participants. Twenty one responses were received, constituting a 37.5% response rate. This response is well above the eleven responses required for a confidence interval of 95% on the median response, as discussed in Chapter III.

The second iteration of the questionnaire was sent to the twenty one respondents of the first round. Fifteen responses were received, constituting a 71.4% response rate. Again, this is above the minimum sample size outlined in Chapter III.

The Investigative Questions

This section analyses the questionnaire responses and applies them to the six thesis investigative questions introduced in Chapter I. As defined in Chapter III, consensus is achieved with a 66.7% or higher agreement on a single Likert scale response. If consensus is not achieved on a single choice, any agreement of 66.7% or higher on one

side of the high/low or agree/disagree axis is noted as a broader kind of consensus. For Likert scale (ordinal) questions, the true population median is estimated, with 95% certainty, through use of the Sign Test, as a statistical supplement to Delphi panelist consensus.

Intra/Inter-Theater Differences. Investigative question #1 was: Is intra-theater mobilization different than inter-theater mobilization? In particular, are time and resources more limited? The Literature Review showed that some intra-theater mobilizations, such as movement forward with the ground battle area; movement to a forward operating location; and retreats or withdrawals because of threats to the air base, are not deliberately planned and face more severe time and resource constraints than do inter-theater mobilizations.

Two questions in the Delphi instrument were designed to expand on this issue. One asked generally if a difference existed and the other focused on differences in time and resource availability.

The panelists were in discord in response to the first (Question #9). A large minority (33.3%) said the two types of mobilization were the same. The other group (60.0%) said they were different. This split in response may reflect the broad, general nature of the question, in that the two types of mobilization may share commonalities as well as differences. The thrust of several comments was that the processes of mobilization did not differ between intra and

inter-theater, but the conditions between intra and inter-theater mobilization did.

The second (Question #14) was more specific and panelists emphatically responded that the conditions of intra-theater mobilization, in terms of time, resources, and environmental uncertainty, were considered by all of the experts to be different from the conditions for inter-theater mobilization. Enough of the experts (73.3%) strongly agreed this difference existed to constitute a consensus of opinion. The rest of the panelists (26.7%) agreed, although not as strongly, that conditions for mobilization intra-theater were different.

Essential Tasks. Investigative question #2: What are the essential tasks a unit must complete for intra-theater mobilization? The Literature Review showed that some of the tasks of mobilization can be identified by considering what must be done before transportation can begin. Chapter III expanded on this approach and proposed seven essential tasks. In the Delphi instrument, a seven part question (Question #12, A through G) was used to poll the panelists on the importance of the seven tasks.

The experts achieved outright consensus on a single level of importance for five of the tasks, rating them as having a high level of importance. Those tasks and the percentages of consensus achieved were: Identify equipment and personnel to be mobilized (66.7%); Prioritize and sequence equipment and personnel (66.7%); Physically prepare

equipment for transport(80.0%); Allocate cargo and passengers to available aircraft loads, trucks, or other transports(73.3%); and Marshall cargo and assemble personnel(73.3%).

The consensus of opinion for the two other tasks was less specific. The importance of one of these tasks was rated somewhat lower. The consensus for loading transports (80.0%) was that their importance to mobilization was high or slightly high. The importance of the other task was rated somewhat higher. The consensus for maintaining internal coordination and control (100%) was on a level of importance that was high or very high. Overall, the consensus of opinion of the experts validated all seven of the tasks as essential tasks for mobilization.

Mobilization Process. Investigative question #3: Can the mobilization process be depicted as a sequential, integral system made up of dependent events? This investigative question focused on identifying any logical process flow that may exist in intra-theater mobilization. One question (Question #10) gathered expert opinion on the validity of a proposed model of the mobilization process flow (Figure 7).

A strong consensus of opinion (80.0%) agreed, by selecting the alternative AGREE on the Likert scale, that the model was an accurate representation of the basic actions needed for intra-theater mobilization. However, a minority who agreed with its accuracy made comments to the

effect that the model was somewhat simplistic. No one disagreed with the model outright, but only recommended additions, and no two commentators recommended the same task for addition to the model. In effect, the model was validated as an accurate representation of the basic mobilization process.

Mobilization Training. Investigative question #4: Are unit personnel trained in mobility necessary for success? The Literature Review established a lack of guidance for mobilization under intra-theater conditions. If trained personnel are unnecessary for successful mobilization, then guidance would also be unnecessary. However, if trained personnel are needed, then guidance should be developed to train them.

Two questions were designed to gather information on the need for trained personnel in the units. The first (Question #8) asked if mobility experts were necessary for success. A broad consensus of opinion was reached (100%), with the experts either agreeing or strongly agreeing that trained personnel were necessary. The second (Question #15) whether units could mobilize intra-theater as easily with experts as without them. Consensus was achieved on a single Likert scale alternative: the panelists disagreed (93.3%) that experts made a no difference. They felt that experts did make a difference. The rest of the panelists (6.7%) agreed even more strongly that experts made a difference in mobilization success.

Mobilization Tools. Investigative question #5: Which existing mobilization tools would be best suited to accomplishing the essential tasks of intra-theater mobilization? The Literature Review noted that some tools suitable for deployment into an intra-theater environment do exist. It also noted that how these tools support the process of intra-theater mobilization and the tasks within that process has not been addressed in official guidance. In other words, these tools have not been evaluated for, or fit into the framework of, an intra-theater mobilization.

Nine questions in the Delphi instrument were used to determine which tools were considered the best for each essential task. These questions asked the experts to rank a given list of tools for a specific task from best to worst. In these questions, tools for accomplishing the seven essential tasks were considered.

The experts chose a deployable automated system as the best tool for three of the tasks, which were the planning tasks of identifying, allocating, and sequencing. The Combat Personnel Computer System (CPCS), rated best by 78.6% of the panelists, was the consensus choice for identifying personnel for deployment. The Automated Schedule of Events (AMSOE), rated best by 73.3%, was the choice for sequencing and prioritizing. Computer Aided Load Manifesting (CALM), rated best by 86.7%, was the choice for allocating assets to transports. The only automated system that was presented and was not selected as the consensus choice was the Stand-

alone LOGMOD-B. This system is meant to identify cargo for deployment and has yet to be fielded. Some experts made comments to the effect that they had no basis for evaluating its worth. Instead, the experts showed a divergence of opinions and chose several different existing tools as best for identifying cargo for deployment, with manual load & packing lists gaining a slight majority (57.2%), but not a consensus.

Checklists did the best for the physical tasks of cargo and personnel preparation. They were a consensus choice as the best tool for passenger preparation (86.7%), and were the majority choice for cargo preparation (64.3%).

Consensus was also achieved on tools for the physical tasks of marshalling and loading, with flowplans/charts (78.6%) and resident expertise (73.3%) being, respectively, the consensus choices.

Finally, expert opinion was split on the best tool for control, coordination, and direction. This split was between a fully-manned mobilization team (60.0%) and a less personnel-intensive redeployment team (40.0%). Some experts commented that they chose the fully-manned team because they felt the USAF does not know how to structure or train redeployment teams. All respondents chose some kind of team as the best tool.

Improvement of Tools. Investigative question #6: If existing tools are not good enough to do the job, how could they be improved? This is a conditional question,

predicated on existing tools being noted as inadequate by the experts.

In the Delphi instrument, collecting information to answer this question depended on answers to nine open-ended questions that followed the questions used to answer investigative question #5. These open-ended questions solicited comments about the adequacy of tools, on which the answer to this investigative question is based.

No consensus of opinion was reached for any of these open ended questions. Most panelists expressed no opinion concerning the adequacy of tools. A significant minority (20%) considered them adequate. Another minority (19.3%) made comments to the effect that tools were not sufficient to do the job. Still, the most common suggestions for improvement deserve some mention.

For those tasks that are primarily planning tasks in nature, such as identifying and sourcing requirements, sequencing and prioritizing assets, and allocating assets to transport vehicles, most suggestions for improvement centered on improving and integrating existing deployable automated systems. Several experts advocated developing one system that integrates CPCS, AMSOE, CALM, and LOGMOD-B for use in the field. Other suggestions include one to make "deployed mobility plans" a standard means for keeping units informed and ready to mobilize.

The tasks that are primarily physical in nature, such as cargo and passenger preparation, marshalling, and loading

onto transports, elicited fewer suggestions for improved tools. Those suggestions that were made focused mostly on improving training and experience, and on quicker and more effective ways to process assets, not on automated systems. Suggestions for improved management, as in better direction, coordination, and control, focused on training, experience, and organization for intra-theater mobility.

The Sign Test

A nonparametric statistical technique, the Sign Test, was used as a supplement for corroborating the levels of consensus found in the second iteration of the Delphi instrument. This technique was valuable in that it could, with a relatively high level of confidence, determine where the true median population opinion was on the Likert scale. The Sign Test was chosen because it is a nonparametric test, meaning inferences can be made about the population from a small sample without any assumptions concerning the underlying probability distribution of population opinion (31:949-952). The Sign Test is shown in Figure 11.

The results of the Sign Test, when applied to the Likert Scale questions, questions #8, #9, #10, #12 (A through G), #14, and #15, substantiate the consensus opinions of the panelists. While the Sign Test is not powerful enough to be as specific as the consensus of panel opinions, it does confirm the median population opinion on a AGREE/DISAGREE or HIGH/LOW axis. Table 1 shows the inputs and conclusions

Sign Test ($n \geq 10$) for a Population Median M

$$H_0: M = M_0$$

$$H_a: M > M_0$$

$$\text{Test Statistic(TS): } z = [(S - .5n) / (.5(n^{1/2}))]$$

M_0 = number on an ordinal scale

S = number of sample $> M_0$

n = number in sample

Rejection Region(RR): $z > 1.645$ (95% confidence)

Figure 11. The Sign Test (31:951)

drawn from the Sign Test as applied to the Likert scale questions.

Spearman Rank Correlations

Question #9, where no consensus was reached and no conclusion was drawn from the Sign Test, was analyzed

Spearman Rank Correlations.

Sees Intra-Theater Mobility
as the same as Inter-Theater

Major Command	-0.0852
Job Title	0.2676
Grade	0.2848
Mobility as Part of Job	-0.2182
Mobility Experience	0.4144
Experience in the Field	0.1738
Sees Units as Ready for Intra-Theater Mobility	0.6390

Figure 12. Spearman Rank Correlations

TABLE 1

Results of Sign Test Application

Alpha = .05: 95% confidence level concerning
the true median population opinion.

Question #	M ₀	S	Test Statistic	Reject Region	Conclusion about median opinion
8,14	3	15	3.6	>1.645	AGREE/HIGHLY AGREE
9	3	9	0.5	>1.645	no conclusion
10	3	13	2.6	>1.645	AGREE/HIGHLY AGREE
12a,b, c,f	4	15	3.6	>1.645	HIGH/VERY HIGH
12d	3	14	3.1	>1.645	SLIGHTLY HIGH/HIGH VERY HIGH
12e	4	13	2.6	>1.645	HIGH/VERY HIGH
12g	4	14	3.1	>1.645	HIGH/VERY HIGH
15	3	15	3.6	>1.645	DISAGREE /HIGHLY DISAGREE

further through the use of another nonparametric statistical technique. A Spearman Rank Correlation was run, using the statistical software package STATISTIX 3.5, to see if answers to any of the background questions were related to

opinion on whether intra-theater mobility was different from inter-theater (Question #9). The results are in Figure 12.

A moderate correlation was found between individuals who felt typical unit preparedness for intra-theater mobilization was low and those who felt intra-theater mobilization was different (0.639 out of a possible perfect correlation of 1.0). In other words, those who felt typical unit preparedness for intra-theater moves was low tended to consider intra-theater mobilization as different. Those who felt preparedness was high tended to consider intra-theater mobilization as no different than inter-theater mobilization. The implication is that if intra-theater mobilization is different, units are not well prepared for it. No other significant correlations were noted.

Chapter Summary

This chapter presented and analyzed the findings for the six investigative questions. Both material established by the Literature Review and information and panelist consensus derived from the Delphi instrument are included in this application. The Sign Test confirmed the consensus found in the Delphi study as representative of the true median opinions of the population of experts.

The Literature Review established intra-theater mobilization as potentially different from inter-theater mobilization. The panelists in the Delphi study did not see intra-theater mobilization as generally different from

inter-theater mobilization, but clearly confirmed the conditions under which intra-theater mobilization operates as different. The Spearman Rank Correlation showed that those panelists who saw intra-theater mobilization as different also perceived USAF units as typically less prepared for intra-theater moves. The panelists also validated the proposed tasks of mobilization as important and accepted the proposed model of the basic mobilization process as accurate. Further, they verified the need for trained mobilization personnel within the units as a key to successful mobilization.

In assessing tools for accomplishing the essential mobilization tasks, the experts chose automated systems as the best tools for planning tasks. Where an automated tool was not available to accomplish a particular planning task, the experts were split in their opinions. The experts preferred checklists, flowcharts, and resident expertise as the best tools for physical tasks, and chose a team of mobility experts as the best tool for control in the field.

Most experts thought existing tools were good enough to do the job or expressed no opinions on adequacy. Those who did not, saw the refinement of existing automated systems, solid training and experience, and concentration on organization as the best avenues for improvement.

Chapter V uses the findings from the investigative questions to answer the research question, addresses study boundaries, and makes recommendations for future research.

V: Conclusions and Recommendations

Overview

This Chapter discusses the research question in the context of the conclusions made from the investigative questions. Additionally, study limitations are addressed. Most notably the study is limited to describing the intra-theater mobilization process. Another limitation examined is that the model produced in the study is a description of the basic process of mobilization, and is not definitive of all possible variations of mobilization.

Future research opportunities are considered, including those that would use the findings of this study as a starting point for establishing procedures and techniques especially applicable to intra-theater unit mobilization.

Lastly, conclusions about the findings of the study are presented, of which the most important is that guidance that specifically addresses the conditions of intra-theater mobilization must be produced.

The Research Question

The purpose of the thesis was to describe intra-theater mobilization. The research question was used to accomplish this purpose and focused on identifying the basic process of unit level intra-theater mobilization. Chapter IV produced findings to the investigative questions, and these findings answered the research question. They described and

identified aspects of the intra-theater mobilization process.

Intra-theater mobilization was shown to consist of an identifiable process. This process is made up of certain actions, or tasks, that must be accomplished for a mobilization to successfully execute. These tasks were also shown to have a definite structure, in that they are sequential and dependent upon each other. A process flow for intra-theater mobilization does exist and can be described.

The study did not find that the intra-theater mobilization process was different from the inter-theater process, but found evidence that the conditions under which that process operates intra-theater can be more demanding. The study also found that cadres of trained personnel, with knowledge and experience in the mobilization process, were key to unit intra-theater mobilization success.

Findings were also made about the tools presently in use for accomplishing mobilization tasks. Automated systems were found to be the best for accomplishing tasks that can be characterized as planning tasks. The experts perceived improvement and integration of these automated systems as the best route for improving the tools used for planning. The best tools for physical tasks were found to be checklists and expertise within the unit. Improvements in training, experience, and organization were seen as the best route for physical tasks.

Conclusions

The consensus reached by the Delphi panelists validated the model, the tasks that make up the model, and the need to have a cadre of trained mobilization personnel within the units. The research question posed in Chapter I was answered, in that the study succeeded in describing the basic process of intra-theater mobilization.

In the course of that description, this thesis showed that intra-theater mobilization does not operate under the same conditions as inter-theater mobilization. Despite this difference in operating conditions, no official guidance exists that addresses mobilization within a theater of operations. The thesis also showed that intra-theater unit level mobilization is an important capability for combat forces, because a failure of that capability can constrain operations. This leads to the conclusion that intra-theater mobilization as an important military capability is not adequately addressed in official guidance.

Since trained and experienced personnel at the unit level are necessary for success, the USAF must produce guidance that will help those who mobilize to gain the expertise they need. This guidance should encompass the special conditions of intra-theater mobilization.

Understanding of the basic process and competence with the best tools should both be recognized as significant factors within that guidance.

Study Boundaries

This study was qualitative and descriptive. The descriptive approach was needed to lay the foundations for subsequent prescriptive or quantitative analysis. As discussed in Chapter I, the nature of the process itself must be described and understood before procedures for accomplishing that process are developed and improved. Consequently, this study does not prescribe solutions for enhancing the mobilization process, but instead describes the process and suggests directions for improvement efforts. Appendix A is a prescriptive thought piece, which is an extension of but not an integral part of the thesis.

Another boundary that must be recognized is that of the model of the mobilization process. This model represents an accurate portrayal of a basic mobilization process flow, but is not all inclusive or definitive of all mobilization process flows. Several comments made by the Delphi panelists noted, while accepting the model as a good basic representation, that situations can exist where mobilization occurs differently than as depicted by the model. Actions depicted in the model may be vastly simplified, such as identifying assets for movement during a move to a forward operating location, when a unit might pick up and move everything it owns. Actions can also be added to the model. One panelist commented that a unit may at times need to source transport vehicles on its own, instead of depending on an outside agency. The model is meant to be a baseline

for the basic mobilization process flow, not a definitive representation of all possible mobilizations.

Recommendations for Future Research

Many opportunities for further research became apparent in the course of this study. This study showed that the conditions for mobilization within a theater of operations can differ from the conditions for other mobilizations, but came to no conclusions as to whether the process of intra-theater mobilization was the same or different than the process of inter-theater mobilization. That needs to be clarified.

A major opportunity for further research is a prescriptive approach to improving process performance. This study laid down a descriptive foundation that can be used to explore different means for improving the intra-theater mobilization process. Research needs to be done that identifies the weak links in the mobilization process and finds ways to strengthen those links. The Theory of Constraints provides a useful approach to upgrading the weak links in a process. Another possible approach would be to quantify the time required to accomplish each mobilization tasks, using data from actual unit mobility exercises, and build a simulation model of the mobilization process. A computer simulation could uncover new insights into the process, and establish the relative value of different tools.

Another area that deserves attention is the organization and training of mobility cadres within the units. Approaches to training and building experience should be addressed. This includes looking at how competence should be introduced into a unit, through specialist mobility experts or as an integral part of unit training. Overall, for intra-theater mobility, the question "how should we do it?" needs to be answered.

Thesis Overview

This thesis looked at the unit level intra-theater mobilization process and made some observations. Most notably, the basic process of intra-theater mobilization was identified and was seen to operate under more demanding conditions than other mobilizations.

The next step, beyond this thesis, is to find and develop the best guidance and tools for executing that process, especially guidance and tools that will work in an intra-theater environment where time is short, resources are limited, and uncertainty is high.

Appendix A: Applying the Theory of Constraints

Certain types of organizations, including the military and organizations that respond to disasters and emergencies, depend on mobility to allow them to respond to unexpected events occurring over a large geographical range. If the mobilization of operational units is not timely and comprehensive, these organizations will fail to perform at their full potential.

This dependence on mobility is especially critical to modern military operations. As the size of the defense establishment shrinks and, with the Cold War over, forces depart from forward bases in Europe and the Pacific, the military will rely increasingly on expeditionary forces that will deploy to a crisis location from the continental United States (29:4-6). The military in the United States no longer has the luxury of knowing who to prepare to fight against and where that fight is most likely to be. Timely response to crisis worldwide will depend on the ability to mobilize quickly.

Applying the Theory of Constraints

TOC evaluates the performance of a process in the context of its contribution to the goals of the larger system in which it is contained. For this reason a system model is constructed to clarify the purpose of mobilization.

Input-output analysis defines the role of mobilization in the larger system (Chapter III).

TOC is also a method that focuses improvement efforts on those elements that limit the outputs of the system; the system constraints. The model of a mobilization system, presented on pages 36-40, characterizes mobilization as a potential constraint on operations. The basic component tasks of mobilization are identified, and given those basic tasks, approaches for maximizing the performance of the mobilization system are suggested, including using excess capacity, stock buffers, and time buffers. The importance of pre-releasing planning tasks is particularly noted.

A Method For Continuous Improvement

Given the concept of mobilization as the link that transforms an operating unit into a transportable one (Chapter III), the Theory of Constraints (TOC) becomes useful for discovering how to get the most out of the mobilization process. TOC fundamentally outlines a process of ongoing improvement within a system or organization. It is based on the premise that "every system is built for a purpose" (22:4). Every element or subsystem in that system must be judged not in isolation, but on what it contributes to the global purpose. The developer of TOC, Dr. Eliyahu Goldratt, expands on this approach:

How to sort out the important few from the trivial many? The key lies in the recognition of the important role of the system's constraints. A system's

constraint is nothing more than what we all feel to be expressed by these words: anything that limits a system from achieving higher performance versus its goal.
(22:4)

Improving system performance is accomplished using five steps, as shown in Figure 12.

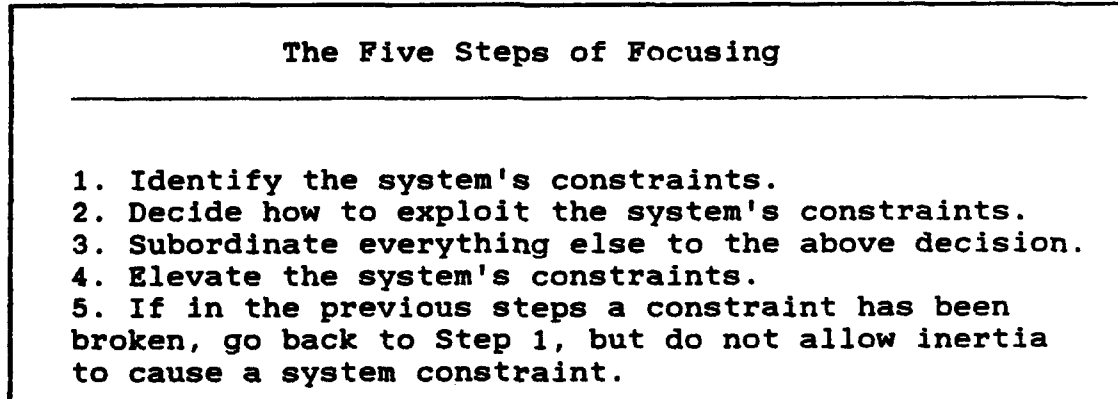


Figure 13. The Five Steps of Focusing (22:7)

The first step includes evaluating potential constraints to weed out trivialities. The second step means managing those elements that are truly constraints to get the most out of them. The third step is to prevent non-constraints from wasting time, resources, and money on activities that will not contribute to the goal of the system, that is, on activities that exceed the capacity of the constraint. Since the constraint limits the performance of the system, implementing the fourth step will improve the performance of the entire system. The entire cycle of five steps is the key to continuous improvement (22:5-7).

Mobilization as a Constraint on Operations

If unit-level mobilization is not quick enough or

comprehensive enough to prepare a unit for transport when a wartime window of opportunity is presented, mobilization will have become a constraint on operations. Mobilization can fail in terms of response time and also fail to preserve, or even to define, the operational integrity of response forces. Inadequate unit-level mobilization capability can prevent an organization from achieving its goal (1:41-46). The need for unit mobilization capability particularly applies to situations involving short lead times, complex and varied resource operating requirements, and the need for response capability throughout a large geographical area.

If the first step of the five TOC steps is taken and mobilization is identified as a constraint, the next step is to manage the constraint to its utmost capacity. This requires a better understanding of the nature of mobilization: of the basic tasks involved in unit-level mobilization, as shown in Figure 7 (Chapter III). Logically, these essential tasks for mobilization can be divided into two types, planning tasks and physical tasks. Planning tasks include the mission statement, identifying and sourcing equipment and manpower requirements, prioritizing and sequencing assets, and allocating these assets to transport vehicles. Physical tasks include the physical preparation, marshalling, and loading of equipment and personnel.

Exploiting the Mobilization Constraint

Given the basic tasks involved, how can the mobilization process best be managed? In TOC the answer is management of the process flow through the use of protective excess capacity and time buffers.

TOC recognizes that any process must focus on maintaining a balanced processing flow, instead of focusing on balancing processing capacity. This is because processes are made up of dependent events and these events each have variable processing times. Events downstream in the process are limited by the variable outputs of the events they are dependent on, so protective capacity ensures that the process flow necessary to meet demand can be maintained despite the variability of individual events (22:138-159).

A simple example is of two processes where the second process is fed items for processing by the first process. In this case the rate of the first process limits the output of the second process. If the first process is performing at a below-average rate, the second will also be limited to that rate. If, instead, the first process has excess protective capacity available it can adjust for variability in processing rates and maintain the flow of items to the second process that is necessary to meet demand. The other technique, a buffer, is used to ensure that as much processing capability as possible is squeezed out of a constraint. Prepositioning tasks for processing in front of a constraint makes sure that the constraint always has work,

that is, the constraint is never left idle and unused and the potential for higher throughput lost (21:121-125).

Perhaps the simplest kind of buffer is a physical stock buffer placed in front of a constraint. Another kind of buffer is one that consists purely of time. With a time buffer, jobs are released early for processing in order to buffer against the ultimate constraint, which is demand for the output of the process. Goldratt refers to this as a shipping buffer, since it buffers against throughput lost when "shipments" of the product are not ready to meet the demand for the product (21:121-125).

Mobilization Stock Buffers. Given the mobilization system, several alternatives exist for exploiting the constraint. The most comprehensive is to build a 100% shipping buffer. In this approach every step in the mobilization process, from mission statement to loading onto transports, would be complete before the need for a move to another location was known. The result would be a stock buffer: an instantly transportable unit. The difficulty is the expense involved in tying up physical resources, both operational and transportation. Operational military resources typically must be exercised to remain proficient. Personnel need training and equipment needs regular maintenance in order to remain effective.

The key is to balance the expense of tying up those resources with the benefits of a faster response. If the benefit from a faster move can justify the expense of

maintaining both mobility assets, ready to go, and training assets, then this would be the best approach to take.

Mobilization Time Buffers. An approach that does not tie up operating forces is to pre-release as much of the planning tasks as possible. This will not affect the operation of physical assets in that it is "off-line" and will reduce the mobilization process to the physical tasks when the time to move arrives. However, expenses exist for this approach as well; those related to maintaining a continuous planning process. Since our ability to forecast requirements for the future is most effective in the short term, plans must be continuously updated and revised to remain effective, and must try to account for all significant possible events. This might include planning for situations that call for different operational capabilities, for different transportation modes, different operating conditions, and so on.

Which Approach to Take? True physical constraints on a process are rare. Most constraints are logistical and policy constraints that result from inadequate planning and control mechanisms (21:62-63). This implies that the limiting factors in mobilization are the planning tasks, not the physical tasks. Oil industry experts, commenting on the Exxon Valdez spill, recognized that a failure in response can be largely due to a failure in planning:

Planning and response go hand-in-hand because without advance preparation, no amount of expertise, manpower, or equipment can be effectively organized on the spot

in the chaotic situation which prevails after a large spill. (1:41)

Focusing on the planning tasks prior to actual mobilization is more likely to result in a faster, more productive mobilization process.

The Other Steps. Often the process of exploiting a constraint will reveal planning and control problems, or in other words, reveal a policy constraint (21:62-63). Failure to pre-release planning tasks is an example of a policy constraint. Once a policy constraint is identified it should be immediately elevated. There is no sense in devoting energy, resources, and time to exploiting a constraint and subordinating an entire system if that constraint is the result of faulty rules. Faulty rules should simply be changed (21:130). Regardless, once mobilization is elevated, the new constraint, whether it is transportation capability, operational capability, or something else, becomes the new focus for improvement of the organization.

Focusing on the core problem, the constraint, and refusing to let inertia take control of the organization, is the key to continuous improvement (22:7).

Appendix B: The Questionnaires

The First Questionnaire

The following is the text of the first questionnaire:

Intra-Theater Mobility Questionnaire

This survey consists of three parts:

1. background information
2. the basic intra-theater mobility process
3. mobility tools.

Questions are both multiple choice and open-ended. Additional comments are encouraged. Answers to the open-ended questions can be short and simple, but more thorough answers are encouraged. Please use the enclosed envelope to return the completed survey NLT 22 May 1992.

The term intra-theater mobility, as used in this questionnaire, refers to a move from a deployment site (not home station) to a new deployment site. An intra-theater move is synonymous with a follow-on move.

1. Background Information

1. MAJCOM (current)

- | | | |
|----------------|--------------|--------------------|
| a. AFLC (AFMC) | e. ATC | i. TAC (ACC) |
| b. AFSC (AFMC) | f. MAC (AMC) | j. USAFE |
| c. ANG | g. PACAF | k. Other (specify) |
| d. AFRES | h. SAC (ACC) | _____. |

2. Job Title (current)

- a. Chief of Resource Plans/Logistics Plans
- b. Chief of Combat Plans
- c. Asst. Chief of Resource Plans/Logistics Plans
- d. Installation Mobility Officer
- e. Other (specify)_____.

3. Grade

- | | | |
|---------------|------------|-----------------------------|
| a. Lieutenant | e. CMSGT | i. GS-11 |
| b. Captain | f. SMSGT | j. GS-12 |
| c. Major | g. MSGT | k. GS-13 |
| d. Lt Colonel | h. GS-9/10 | l. Other(specify)
_____. |

4. Mobility as Part of the Job

How would you rate the importance of mobility as a part of your job?

- | | | | | | |
|-------------|-----|-----------------|------------------|------|--------------|
| a. | b. | c. | d. | e. | f. |
| Very
Low | Low | Slightly
Low | Slightly
High | High | Very
High |

5. Years of Experience in Mobility

- a. Less than 2 years
- b. 2 years to 6 years
- c. 6 years to 10 years
- d. 10 years to 12 years
- e. More than 12 years

6. Mobility in the Field

How would you characterize the level of your experience with mobility in the field? This could include work on redeployments, follow-on moves, or other mobility operations away from home station.

a.	b.	c.	d.	e.	f.
Very Low	Low	Slightly Low	Slightly High	High	Very High

7. Readiness for Intra-Theater Mobility

How would you characterize the level of preparedness of the typical Air Force wing for a follow-on move once in a Theater of Operations? This includes the possibility of having to disperse squadrons or smaller elements out to multiple operating locations after initial deployment.

a.	b.	c.	d.	e.	f.
Very Low	Low	Slightly Low	Slightly High	High	Very High

2. The Basic Intra-Theater Mobility Process

This section addresses the fundamental tasks a unit faces during an intra-theater (follow-on) mobilization. For the multiple choice questions select the single best answer.

8. Having mobility experts (logistics plans, transportation plans, combat plans, etc.) deployed with the unit is critical to successful mobilization in the field.

a.	b.	c.	d.	e.
Highly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Highly Agree

Comments: _____

9. Mobilization of a squadron or wing within a theater of operations is essentially the same as mobilization from home station.

a.	b.	c.	d.	e.
Highly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Highly Agree

Comments: _____

10. The proposed system for intra-theater mobility, as shown in [Figure 7], accurately represents the basic actions needed for a unit to mobilize within a theater of operations.

a.	b.	c.	d.	e.
Highly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Highly Agree

Comments: _____

11. Would you add or delete actions from this system to make it more representative of reality? Please explain your decision.

12. For a unit mobilization within a theater of operations, rate the level of importance for the following actions (A through G), as performed by the deploying unit:

A. Action: Physically prepare equipment for transport

Level of Importance

a.	b.	c.	d.	e.	f.
Very Low	Low	Slightly Low	Slightly High	High	Very High

B. Action: Maintain internal coordination and control of mobility operations

Level of Importance

a.	b.	c.	d.	e.	f.
Very Low	Low	Slightly Low	Slightly High	High	Very High

C. Action: Marshall cargo and assemble personnel

Level of Importance

a.	b.	c.	d.	e.	f.
Very Low	Low	Slightly Low	Slightly High	High	Very High

D. Action: Load transports

Level of Importance

a.	b.	c.	d.	e.	f.
Very Low	Low	Slightly Low	Slightly High	High	Very High

E. Action: Prioritize and sequence equipment and personnel

Level of Importance

a.	b.	c.	d.	e.	f.
Very Low	Low	Slightly Low	Slightly High	High	Very High

F. Action: Identify equipment and personnel to be mobilized

Level of Importance

a.	b.	c.	d.	e.	f.
Very Low	Low	Slightly Low	Slightly High	High	Very High

G. Action: Allocate cargo and passengers to available aircraft loads, trucks, or other transports

Level of Importance

a.	b.	c.	d.	e.	f.
Very Low	Low	Slightly Low	Slightly High	High	Very High

13. Comment on the relative importance of these actions (see [Figure 7]) to intra-theater mobility. Are any significantly more or less important for success than the others? If so, explain.

14. During war, an intra-theater mobilization is more likely to operate with fewer resources, shorter lead times, and in a more unpredictable environment than a wartime mobilization from home station.

a.	b.	c.	d.	e.
Highly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Highly Agree

Comments: _____

15. A unit already in the field can pick up and move again without having mobility personnel available to direct and coordinate activity as well as it can with mobility personnel available to direct and coordinate activity.

a.	b.	c.	d.	e.
Highly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Highly Agree

Comments: _____

3. Mobility Tools

This section looks at tools commonly used to implement specific actions during mobilization. Rank the tools from best to worst in terms of how well they help to accomplish the action mentioned. If you have no opinion on a particular tool, leave it out of the rankings. If you have no opinion for all of the tools related to an action, state so in the open-ended question that follows each ranking question.

16. Rank the following as tools for allocating assets to transports in an intra-theater mobility environment.

- Best 1.____ a. Manual Load Planning
 2.____ b. Computer Aided Load Planning (CALM)
 3.____ c. Resident Expertise Only
 4.____ d. Other (specify)_____.
Worst 5.____ e. No System

17. Are the available tools for allocating assets to transports good enough? If not, how could they be improved?

18. Rank the following as tools for identifying equipment for deployment in an intra-theater mobility environment. This question focuses on the process of determining equipment requirements as well as identifying actual equipment items to fill those requirements.

- Best 1.____ a. Checklists
 2.____ b. Stand-alone LOGMOD-B (in development)
 3.____ c. Resident Expertise Only
 4.____ d. Hard Copies of Load & Packing Lists
 5.____ e. Other (specify)_____.
Worst 6.____ f. No System

19. Are the available tools for identifying equipment for deployment good enough? If not, how could they be improved?

20. Rank the following as tools for identifying personnel for deployment in an intra-theater mobility environment. This question focuses on the process of determining manpower requirements as well as identifying actual personnel items to fill those requirements.

- Best 1.____ a. Checklists
 2.____ b. Combat Personnel Computer System (CPCS)
 3.____ c. Resident Expertise Only
 4.____ d. Hard Copies from Home Station (MANPER-B)
 5.____ e. Other (specify)_____
Worst 6.____ f. No System

21. Are the available tools for identifying personnel for deployment good enough? If not, how could they be improved?

22. Rank the following as tools for prioritizing and sequencing personnel and equipment in an intra-theater mobility environment.

- Best 1.____ a. Checklists
 2.____ b. Automated Mobility Schedule of Events (AMSOE)
 3.____ c. Resident Expertise Only
 4.____ d. Standardized Manual Forms
 5.____ e. Other (specify)_____
Worst 6.____ f. No System

23. Are the available tools for prioritizing and sequencing personnel and equipment good enough? If not, how could they be improved?

24. Rank the following as tools for physical preparation of equipment for transport in an intra-theater mobility environment.

- Best 1.____ a. Checklists
 2.____ b. Resident Expertise Only
 3.____ c. Hazardous Cargo Sample Books (DD Form 1387-2)
 4.____ d. Other (specify)_____
Worst 5.____ e. No System

25. Are the available tools for physical preparation of equipment for transport good enough? If not, how could they be improved?

26. Rank the following as tools for physical preparation of personnel for transport in an intra-theater mobility environment.

- Best 1.____ a. Checklists
 2.____ b. Passenger Briefings
 3.____ c. Resident Expertise Only
 6.____ d. Other (specify)_____
Worst 7.____ e. No System

27. Are the available tools for physical preparation of personnel for transport good enough? If not, how could they be improved?

28. Rank the following as tools for marshalling equipment and assembling personnel in an intra-theater mobility environment.

- Best 1. _____ a. Checklists
 2. _____ b. Movement Flow Plans and Charts
 3. _____ c. Resident Expertise Only
 4. _____ d. Other (specify) _____.
Worst 5. _____ e. No System

29. Are the tools for marshalling equipment and assembling personnel good enough? If not, how could they be improved?

30. Rank the following as tools for loading equipment and personnel onto transports in an intra-theater mobility environment.

- Best 1. _____ a. Checklists
 2. _____ b. Resident Expertise Only
 3. _____ c. Other (specify) _____.
Worst 4. _____ d. No System

31. Are the tools for loading equipment and personnel onto transports good enough? If not, how could they be improved?

32. Rank the following as tools for directing, coordinating, and controlling mobilization in an intra-theater mobility environment.

- Best 1.____ a. Checklists
 2.____ b. Fully Staffed Mobility Machine (MCC,TCU,...)
 3.____ c. Redeployment Assistance Team (RAT)
 4.____ d. Other (specify)_____
Worst 5.____ e. No System

33. Are the tools for directing, coordinating, and controlling mobilization good enough? If not, how could they be improved?

34. Additional comments on the basic actions required for intra-theater mobility and the tools used to mobilize.

The Second Questionnaire

The following is the text from the second questionnaire:

Intra-Theater Mobility Questionnaire

This survey consists of three parts:

1. background information
2. the basic intra-theater mobility process
3. mobility tools.

Questions are both multiple choice and open-ended. Additional comments are encouraged. Answers to the open-ended questions can be short and simple, but more thorough answers are encouraged. Please use the enclosed envelope to return the completed survey NLT 31 July 1992.

The term intra-theater mobility, as used in this questionnaire, refers to a move from a deployment site (not home station) to a new deployment site. An intra-theater move is synonymous with a follow-on move.

1. Background Information

1. MAJCOM (current)

- | | | |
|----------------|--------------|--------------------|
| a. AFLC (AFMC) | e. ATC | i. TAC (ACC) |
| b. AFSC (AFMC) | f. MAC (AMC) | j. USAFE |
| c. ANG | g. PACAF | k. Other (specify) |
| d. AFRES | h. SAC (ACC) | _____. |

2. Job Title (current)

- a. Chief of Resource Plans/Logistics Plans
- b. Chief of Combat Plans
- c. Asst. Chief of Resource Plans/Logistics Plans
- d. Installation Mobility Officer
- e. Other (specify)_____.

3. Grade

- | | | |
|---------------|------------|-------------------|
| a. Lieutenant | e. CMSGT | i. GS-11 |
| b. Captain | f. SMSGT | j. GS-12 |
| c. Major | g. MSGT | k. GS-13 |
| d. Lt Colonel | h. GS-9/10 | l. Other(specify) |

4. Mobility as Part of the Job

How would you rate the importance of mobility as a part of your job?

a.	b.	c.	d.	e.	f.
Very Low	Low	Slightly Low	Slightly High	High	Very High

5. Years of Experience in Mobility

- a. Less than 2 years
- b. 2 years to 6 years
- c. 6 years to 10 years
- d. 10 years to 12 years
- e. More than 12 years

6. Mobility in the Field

How would you characterize the level of your experience with mobility in the field? This could include work on redeployments, follow-on moves, or other mobility operations away from home station.

a.	b.	c.	d.	e.	f.
Very Low	Low	Slightly Low	Slightly High	High	Very High

7. Readiness for Intra-Theater Mobility

How would you characterize the level of preparedness of the typical Air Force wing for a follow-on move once in a Theater of Operations? This includes the possibility of having to disperse squadrons or smaller elements out to multiple operating locations after initial deployment.

a.	b.	c.	d.	e.	f.
Very Low	Low	Slightly Low	Slightly High	High	Very High

2. The Basic Intra-Theater Mobility Process

This section addresses the fundamental tasks a unit faces during an intra-theater (follow-on) mobilization. For the multiple choice questions circle the single best answer.

8. Having mobility experts (logistics plans, transportation plans, combat plans, etc.) deployed with the unit is critical to successful mobilization in the field.

a.	b.	c.	d.	e.
Highly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Highly Agree

Comments: _____

1st Survey Responses: 57% chose HIGHLY AGREE.

28% chose AGREE.

10% chose NEITHER AGREE NOR DISAGREE.

5% chose DISAGREE.

Summary of Comments: Two trends of thought were evident. One can be summarized by the statement "Mandatory for successful move ," and the other by the statement "If you have done your preplanning, the person in charge should have no problem moving onward."

9. Mobilization of a squadron or wing within a theater of operations is essentially the same as mobilization from home station.

a.	b.	c.	d.	e.
Highly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Highly Agree

Comments: _____

1st Survey Responses: 38% chose AGREE.

52% chose DISAGREE.

10% chose HIGHLY DISAGREE.

Summary of Comments: Comments basically fell into four categories:

1. "I really don't know."
2. "Don't have the resources (MHE), time or people (overhead who did not deploy) to assist."
3. "During DESERT STORM our troops basically mobilized themselves intra-theater ...since the equipment and personnel was previously prioritized and pre-planned."
4. "Not even close to being true...we had a helluva time getting our prepositioned assets in place in the desert."

10. The proposed system for intra-theater mobility, as shown in [Figure 7], accurately represents the basic actions needed for a unit to mobilize within a theater of operations.

a.	b.	c.	d.	e.
Highly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Highly Agree

Comments: _____

1st Survey Responses: 5% chose HIGHLY AGREE.

67% chose AGREE.

24% CHOSE NEITHER AGREE NOR DISAGREE.

5% chose DISAGREE.

11. Would you add or delete actions from this system to make it more representative of reality? Please explain your decision.

Summary of Comments: The most representative responses were:

1. "No, ok as is."
2. "Somewhat simplistic."
3. "Add something (data from site survey, PERSCO interface, scope of the tasking, acquisition of transport, etc)."
4. "A system can always be improved, but it is good now."

12. For a unit mobilization within a theater of operations, rate the level of importance for the following actions (A through G), as performed by the deploying unit:

A. Action: Physically prepare equipment for transport

Level of Importance

a.	b.	c.	d.	e.	f.
Very Low	Low	Slightly Low	Slightly High	High	Very High

1st Survey Responses: 29% chose VERY HIGH.

57% chose HIGH.

14% chose SLIGHTLY HIGH.

B. Action: Maintain internal coordination and control of mobility operations

Level of Importance

a.	b.	c.	d.	e.	f.
Very Low	Low	Slightly Low	Slightly High	High	Very High

1st Survey Responses: 47% chose VERY HIGH.

43% chose HIGH.

10% chose SLIGHTLY HIGH.

C. Action: Marshall cargo and assemble personnel

Level of Importance

a.	b.	c.	d.	e.	f.
Very Low	Low	Slightly Low	Slightly High	High	Very High

1st Survey Responses: 24% chose VERY HIGH.

47% chose HIGH.

29% chose SLIGHTLY HIGH.

D. Action: Load transports

Level of Importance

a.	b.	c.	d.	e.	f.
Very Low	Low	Slightly Low	Slightly High	High	Very High

1st Survey Responses: 28% chose VERY HIGH.

14% chose HIGH.

48% chose SLIGHTLY HIGH.

5% chose SLIGHTLY LOW.

5% chose LOW.

E. Action: Prioritize and sequence equipment and personnel

Level of Importance

a.	b.	c.	d.	e.	f.
Very Low	Low	Slightly Low	Slightly High	High	Very High

1st Survey Results: 24% chose VERY HIGH.

52% chose HIGH.

14% chose SLIGHTLY HIGH.

10% chose SLIGHTLY LOW.

F. Action: Identify equipment and personnel to be mobilized

Level of Importance

a.	b.	c.	d.	e.	f.
Very Low	Low	Slightly Low	Slightly High	High	Very High

1st Survey Results: 33% chose VERY HIGH.

48% chose HIGH.

10% chose SLIGHTLY HIGH.

G. Action: Allocate cargo and passengers to available aircraft
loads, trucks, or other transports

Level of Importance

a.	b.	c.	d.	e.	f.
Very Low	Low	Slightly Low	Slightly High	High	Very High

1st Survey Responses: 33% chose VERY HIGH.

38% chose HIGH.

24% chose SLIGHTLY HIGH.

5% chose SLIGHTLY LOW.

13. Comment on the relative importance of these actions (see [Figure 7]) to intra-theater mobility. Are any significantly more or less important for success than the others? If so, explain.

Summary of Responses: The most representative responses were:

1. "All are very important. No significant differences."
2. "If you do the preplanning of getting the people and cargo ready for deployment the processing and loading should be routine and easy."
3. "Identifying and preparing are probably the most important."

14. During war, an intra-theater mobilization is more likely to operate with fewer resources, shorter lead times, and in a more unpredictable environment than a wartime mobilization from home station.

a.	b.	c.	d.	e.
Highly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Highly Agree

Comments: _____

1st Survey Responses: 67% chose HIGHLY AGREE.

33% chose AGREE.

Summary of Comments: The most representative responses were:

1. "Agree! ... Communication, command and control are deteriorated and people become pack rats during war."

2. "normal frag's, levies, etc are most times replaced with telecon's."

15. A unit already in the field can pick up and move again without having mobility personnel available to direct and coordinate activity as well as it can with mobility personnel available to direct and coordinate activity.

a.	b.	c.	d.	e.
Highly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Highly Agree

Comments: _____

1st Survey Responses: 5% chose HIGHLY AGREE.

10% chose NEITHER AGREE NOR DISAGREE.

67% chose DISAGREE.

18% chose HIGHLY DISAGREE.

Summary of Comments: The most representative comments were:

1. "Normally the people on mobility are not trained in redeployment assistance team (RAT) requirements."
2. "Most units can accomplish the task, but with some difficulty. Proper direction and coordination can ease operations and prevent confusion."
3. "I think it is even more important to have mobility personnel available in the field."
4. "As problems occur and changes in airlift or mode of transport changes, mobility personnel are extremely important. Units in the field can expect these changes and problems."

3. Mobility Tools

This section looks at tools commonly used to implement specific actions during mobilization. Rank the tools from best to worst in terms of how well they help to accomplish the action mentioned. If you have no opinion on a particular tool, leave it out of the rankings. If you have no opinion for all of the tools related to an action, state so in the open-ended question that follows each ranking question.

16. Rank the following as tools for allocating assets to transports in an intra-theater mobility environment.

- Best 1.____ a. Manual Load Planning
 2.____ b. Computer Aided Load Planning (CALM)
 3.____ c. Resident Expertise Only

1st Survey Responses: 75% chose CALM as the best tool.

15% chose OTHER as the best tool.

10% chose RESIDENT EXPERTISE as the best tool.

5% chose MANUAL LOAD PLANNING as the best tool.

17. Are the available tools for allocating assets to transports good enough? If not, how could they be improved?

Summary of Comments: The most representative comments were:

1. "They are sufficient."
2. "How well do computers work in the field? The big unknown."
3. "No. CALM needs to be improved - locks up computer."

18. Rank the following as tools for identifying equipment for deployment in an intra-theater mobility environment. This question focuses on the process of determining equipment requirements as well as identifying actual equipment items to fill those requirements.

- Best
1. _____ a. Checklists
 2. _____ b. Stand-alone LOGMOD-B (in development)
 3. _____ c. Resident Expertise Only
 4. _____ d. Hard Copies of Load & Packing Lists

1st Survey Responses: 40% chose COPIES OF LOAD & PACKING
LISTS as the best tool.
30% chose STAND-ALONE LOGMOD-B as the
best tool.
15% chose CHECKLISTS as the best tool.
15% chose RESIDENT EXPERTISE as the
best tool.

19. Are the available tools for identifying equipment for
deployment good enough? If not, how could they be improved?

Summary of Comments: The following are representative of
responses:

1. "No - Computerized systems need to be more user friendly.
Data entry to update the database is too complex & labor
intensive.
2. "They are sufficient."
3. "Not too familiar with the Stand-alone LOGMOD-B."

20. Rank the following as tools for identifying personnel for
deployment in an intra-theater mobility environment. This
question focuses on the process of determining manpower

requirements as well as identifying actual personnel items to fill those requirements.

- Best 1.____ a. Checklists
 2.____ b. Combat Personnel Computer System (CPCS)
 3.____ c. Resident Expertise Only
 4.____ d. Hard Copies from Home Station (MANPER-B)

1st Survey Responses: 35% chose CPCS as the best tool.
 25% chose COPIES OF MANPER-B as the
 best tool.
 20% chose RESIDENT EXPERTISE as the
 best tool.
 10% chose CHECKLIST as the best tool.
 10% chose OTHER as the best tool.

21. Are the available tools for identifying personnel for deployment good enough? If not, how could they be improved?

Summary of Comments: The following are representative of comments:

1. "We use DRDs [Deployment Requirements Documents] to pre-plan personnel.

They are filled out with names, etc. at the time of execution."

2. "They are sufficient."

3. "The CPCS has so far proven to be unreliable for the task."

4. "By making the CPCS system compatible w/AMSOE and COMPES!"

22. Rank the following as tools for prioritizing and sequencing personnel and equipment in an intra-theater mobility environment.

- Best
1. ____ a. Checklists
 2. ____ b. Automated Mobility Schedule of Events (AMSOE)
 3. ____ c. Resident Expertise Only
 4. ____ d. Standardized Manual Forms

1st Survey Responses: 45% chose AMSOE as the best tool.
20% chose MANUAL FORMS as the best tool.
15% chose RESIDENT EXPERTISE as the best tool.
10% chose CHECKLISTS as the best tool.
10% chose OTHER as the best tool.

23. Are the available tools for prioritizing and sequencing personnel and equipment good enough? If not, how could they be improved?

Summary of Comments: The most representative comments were:
1. "No; AMSOE is a joke. A simple computer system operating LOTUS 1-2-3 or ENABLE spreadsheet software is much simpler and

more powerful. AMSOE is much too complex and is not at all user friendly. Why?"

2. "They are sufficient."

3. "A. Prioritizing cargo done by loadplanning.

B. Prioritizing PAX done by chalking in loadplanning then adding to CPCS.

C. Then taking A + B above and putting times to them to create an SOE..."

4. "No - We use expertise of ALCE [Airlift Control Element], or mission commander to determine what he wants - no system developed."

24. Rank the following as tools for physical preparation of equipment for transport in an intra-theater mobility environment.

Best 1.____ a. Checklists

2.____ b. Resident Expertise Only

3.____ c. Hazardous Cargo Sample Books (DD Form 1387-2)

1st Survey Responses: 45% chose CHECKLISTS as the best tool.

35% chose HAZARDOUS CARGO BOOKS as the best tool.

20% chose RESIDENT EXPERTISE as the best tool.

25. Are the available tools for physical preparation of equipment for transport good enough? If not, how could they be improved?

Summary of Comments: The following were the most representative comments:

1. "No. There has got to be a faster way of processing cargo."
2. "Training and exercise."
3. "They are sufficient."
4. "1. All inclusive checklist.
2. Packing list software (simplified) on laptop computer.
3. -2 [hazardous cargo certification] software on laptop computer."

26. Rank the following as tools for physical preparation of personnel for transport in an intra-theater mobility environment.

- Best
1. ____ a. Checklists
 2. ____ b. Passenger Briefings
 3. ____ c. Resident Expertise Only

1st Survey Responses: 50% chose CHECKLISTS as the best tool.
30% chose RESIDENT EXPERTISE as the best tool.

10% chose PASSENGER BRIEFINGS as the
best tool.

10% chose OTHER as the best tool.

27. Are the available tools for physical preparation of personnel for transport good enough? If not, how could they be improved?

Summary of Comments: The following are representatives of the comments made:

1. "The briefings are essentially a waste of time. The info required in the briefings to be is a little or no consequence."

2. "Yes. The PAX briefings should be mandatory for all personnel."

3. "They are sufficient."

4. "Individual responsibility is a must. The best tools are an individual responsibility checklist and a mean commander with a big hammer who takes his job seriously."

28. Rank the following as tools for marshalling equipment and assembling personnel in an intra-theater mobility environment.

Best 1.____ a. Checklists
 2.____ b. Movement Flow Plans and Charts
 3.____ c. Resident Expertise Only

1st Survey Responses: 50% chose FLOWPLANS AND CHARTS as the best tool.

25% chose CHECKLISTS as the best tool.

25% chose RESIDENT EXPERTISE as the best tool.

29. Are the tools for marshalling equipment and assembling personnel good enough? If not, how could they be improved?

Summary of Comments: The following are representative of the comments made:

1. "No. Build a faster way of processing cargo."
2. "They are sufficient."
3. "simple time-phased action chart on portable computer with modern capability to quickly notify all interested and concerned parties over common telephone lines or by telefax."
4. "Common sense used by all goes much farther than any flowplan or chart I've used..."

30. Rank the following as tools for loading equipment and personnel onto transports in an intra-theater mobility environment.

- Best 1. ____ a. Checklists
 2. ____ b. Resident Expertise Only

1st Survey Responses: 50% chose RESIDENT EXPERTISE as the best tool.

45% chose CHECKLIST as the best tool.

5% chose OTHER as the best tool.

31. Are the tools for loading equipment and personnel onto transports good enough? If not, how could they be improved?

Summary of Comments: The following are representative of the comments made:

1. "Experience and training are so important."
2. "They are sufficient."
3. "Yes, but very dependent on transport support personnel."
4. "1) Loggies need more training in/on/around transport vehicles.

2) How can I determine the best mode of surface transport if I don't know what the thing is/does or is capable of?"

32. Rank the following as tools for directing, coordinating, and controlling mobilization in an intra-theater mobility environment.

- Best 1.____ a. Checklists
 2.____ b. Fully Staffed Mobility Machine (MCC,TCU,...)
 3.____ c. Redeployment Assistance Team (RAT)

1st Survey Responses: 65% chose FULL CONTROL CENTER as the
 best tool.

 30% chose REDEPLOYMENT ASSISTANCE TEAM
 as the best tool.

 5% chose CHECKLISTS as the best tool.

33. Are the tools for directing, coordinating, and
controlling mobilization good enough? If not, how could they
be improved?

Summary of Comments: The following are representative of the
comments made:

1. "They are sufficient."
2. "Yes. If you have a fully staffed mobility machine in the
intra-theater."
3. "There doesn't seem to be an organizational structure for
follow-on moves after a unit leaves home station. There is no
guidance for who has responsibility for follow-on moves...
Higher HQ has not emphasized training within a unit for
follow-on movement."

Appendix C: List of Questionnaire Recipients

27 TW/LSS/LSXX
CANNON AFB NM 88103-5000

33 TW/LSS/LSXX
EGLIN AFB FL 32542-6004

388 TW/LSS/LSXX
HILL AFB UT 84056-5006

31 TW/LSS/LSXX
HOMESTEAD AFB FL 33039-5000

347 TW/LSS/LSXX
MOODY AFB GA 31699-5000

366 TW/LSS/LSXX
MT HOME AFB ID 83648-5000

474 TW/LSS/LSXX
NELLIS AFB NV 89191

4 TW/LSS/LSXX
SEYMOUR-JOHNSON AFB NC 27531-5004

507 TAIRCW/LSS/LSXX
SHAW AFB SC 29152 5000

552 AWACS/LSMX
TINKER AFB OK 73145-6503

315 MAW/RMX
CHARLESTON AFB SC 29404-6004

930 TFG/RMX
GRISSOM AFB IN 46971-5000

433 MAW/RMX
KELLY AFB TX 78241-6004

908 TAG/RMX
MAXWELL AFB AL 36112-5000

926 TFG/RMX
NAS NEW ORLEANS LA 70143-5400

911 TAG/RMX
PITTSBURGH IAP PA 15231-5000

927 TAG/RMX
SELFRIDGE ANGB MI 48045-5046

439 MAW/RMX
WESTOVER AFB MA 01022-5000

906 TFG/RMX
WRIGHT-PATTERSON AFB OH 45433-5000

117 TRW/LGX
BIRMINGHAM MUNI APT
BIRMINGHAM AL 35217-3595

136 TAW/LGX
HENSLEY FLD DALLAS TX 75211-9503

188 TFG/LGX
EBBING ANGB MUNI APRT
FT SMITH AR 72903-6096

176 TAG/LGX
6000 AIR GUARD RD
KULIS ANG BASE AK 99502-1998

167 TAG/LGX
EASTERN WVA REGIONAL ARPT
MARTINSBURG WV 25401-0204

128 ARG/LGX
1919 E. GRANGE AVE
MILWAUKEE WI 53207-6199

143 TAG/LGX
QUONSET STATE APRT
NORTH KINGSTOWN RI 02852-0794

151 ARG/LGX
765 N. 2200 WEST SALT LAKE CITY
UT 84116-2999

178 TFG/LGX
SPRINGFIELD-BECKLEY ARPT
SPRINGFIELD OH 45501-1780

340 ARF/XP
ALTUS AFB OK 73523-5000

2 LSS/LGLX
BARKSDALE AFB LA 71110-5000

93 LSS/LGLX
CASTLE AFB CA 95342-5000

92 LSS/LGLX
FAIRCHILD AFB WA 99011-5000

305 LSS/LGLX
GRISSOM AFB IN 46971-5000

42 LSS/LGLX
LORING AFB ME 04751-5000

384 LSS/LGLX
MCCONNELL AFB KS 67221-5000

379 LSS/LGLX
WURTSMITH AFB MI 48753-5000

443 AW/XP
ALTUS AFB OK 73523

436 AW/XP
DOVER AFB DE 19901

463 AW/XP
DYESS AFB TX 79607

1 SOW/XP
HURLBURT FLD FL 32544

62 AW/XP
MCCHORD AFB WA 98438

63 AW/XPO
NORTON AFB CA 92409

313 TAG/LGX
RAF MILDENHALL UK 09127

316 TAG/LGX
YOKOTA AB JA 96328

8 TFW/LGX
KUNSAN AB RK 96264-5000

432 TFW/LGX
MISAWA AB JA 96519-5000

51 TFW/LGX
OSAN AB RK 96570-5000

36 TFW/LGX
BITBURG AB GE 09132-5000

50 TFW/LGX
HAHN AB GE 09109-5000

10 TFW/LGX
RAF ALCONBURY UK 09238-5000

81 TFW/LGX
RAF BENTWATERS UK 09755-5000

86 TFW/LGX
RAMSTEIN AB GE 09094-5000

601 TCW/LGX
SEMBACH AB GE 09136-5000

52 TFW/LGX
SPANGDAHLEM AB GE 09126-5000

26 TRW/LGX
ZWEIBRUCKEN AB GE 09860-5000

21 LSS/LSXX
ELMENDORF AFB AK 99506

Appendix D: Definition of Terms

air power - The ability to project military force by or from a platform in the third dimension above the surface of the earth (8:glossary).

CALM - Computer Aided Load Manifesting is an automated software system for airlift load planning. A load plan is a document which presents in detail all instructions for the arrangement of personnel and equipment aboard a given aircraft; it also serves as a manifest (12:Glossary-4).

close air support - Air action against hostile targets which are in close proximity to friendly forces and which require detailed integration of each air mission with the fire and movement of those forces (26:70).

COMPES - Contingency Operations Mobility Planning and Execution System is an automated data processing system that integrates logistics, manpower, personnel, and operations planning to improve response to contingency situations. COMPES gives planners access to real time logistics, manpower, and personnel data (10:3).

CPCS - Combat Personnel Computer System is a portable computer system for processing MANPER-B and other personnel related information.

doctrine - Fundamental principles by which the military forces guide their actions in support of objectives. It is authoritative but requires judgement in application (26:118).

fitness-for-use - Quality or the characteristics of products that meet the needs of those who use them (27:1).

interdiction - An action to divert, disrupt, delay or destroy the enemy's surface military potential before it can be used effectively against friendly forces (26:187).

inter-theater - Between theaters of operations (26:370).

intra-theater - Within theaters of operations (26:370).

JOPES - Joint operations planning and execution system. A system that forms the foundation of the U.S. command and control system consisting of policies, procedures, and reporting systems supported by automation used to monitor, plan, and execute mobilization, deployment, employment, and

sustainment activities in peace, exercises, crises, and war (31:I-17).

logistics - The science of planning and carrying out the movement and maintenance of forces (26:211).

LOGMOD-B - Base level logistics module of COMPES which produces the material lists, packing and load lists, and manpower interface products for UTC packages (10:4,17).

MANPER-B - Base level manpower module of COMPES which produces UTC manpower package requirements, deployment manning documents, and mobility requirements and resources (10:16).

mobility - A quality of capability of military forces which permits them to move from place to place while retaining the ability to fulfill their mission (26:237).

mobilization - The process by which the armed forces or part of them are brought to a state of readiness for war or other national emergency. This includes assembling and organizing personnel, supplies, and material for active military service (26:237).

operating forces - Those forces whose primary missions are to participate in combat and the integral supporting elements thereof (26:262).

operation - A military action or the carrying out of a strategic, tactical, service, training, or administrative military mission; the process of carrying on combat, including movement, supply, attack, defense, and maneuvers needed to gain the objectives of any battle or campaign (26:262).

operational level of war - The level of war at which campaigns and operations are planned, conducted, and sustained to accomplish strategic objectives within theaters or areas of operations (26:264).

operational readiness - The capability of a unit/formation, ship, weapon system or equipment to perform the missions or functions for which it is organized or designed (26:264).

strategic level of war - The level of war at which a nation or group of nations determines national or alliance security objectives and develops and uses national resources to accomplish those objectives (26:349).

tactical level of war - The level of war at which battles and engagements are planned and executed to accomplish military objectives assigned to tactical units or task forces (26:362).

theater of operations - That portion of an area of war necessary for military operations and for the administration of such operations (26:370).

unit - Any military element whose structure is prescribed by competent authority, such as a table of organization and equipment; specifically, part of an organization (26:384).

Unit Type Code - UTCs are force packages of manpower and or equipment to accomplish a specific mission (10:16).

Appendix E: Questionnaire Data

Overview

This appendix is an extensive summary of the data collected by the Delphi instrument questionnaires. Answers from the first questionnaire, excepting comments, are excluded because they are already summarized within the text of the second questionnaire (Appendix B).

Background Questions

Questions #1 through #7 are background questions.

Figure 28 shows the results of Question #2: most panelists

<u>Job Title</u>
Chief of Resource Plans/Logistics Plans: 60.0%
Asst. Chief of Resource Plans/Logistics Plans: 20.0%
Chief of Combat Plans/Other: 20.0%

Figure 14. Responses to Question #2

were chiefs of resource plans. Those who were not were either assistant chiefs of resource plans or supervisors within the resource plans office. Figure 29 shows how panelists rated the importance of mobility as a part of their job (Question #4). All chose HIGH or VERY HIGH. The rest of the background questions, including Major Command, grade, years of mobility experience, experience with mobility in the field, and perception of unit readiness for intra-theater mobilization, are summarized in Figure 30.

Importance of Mobility as a Part of the Job

HIGH: 40.0%
VERY HIGH: 60.0%

Figure 15. Responses to Question #4

<u>MAJCOM</u>	<u>Grade</u>
ANG: 13.3%	Lieutenant: 13.3%
AFRES: 20.0%	Captain: 33.3%
MAC(AMC): 26.7%	Major: 20.0%
TAC(ACC): 33.3%	Lt Colonel: 13.3%
USAFE: 6.7%	Other: 20.0%
<u>Years of</u> <u>Mobility Experience</u>	<u>Experience with</u> <u>Mobility in the Field</u>
Less than 2: 6.7%	LOW: 13.3%
2 to 6: 46.7%	SLIGHTLY LOW: 20.0%
6 to 10: 20.0%	SLIGHTLY HIGH: 13.3%
More than 12: 26.7%	HIGH: 20.0%
	VERY HIGH: 33.3%
<u>Perception of Unit Readiness</u> <u>Intra-Theater Mobilization</u>	
LOW: 13.3%	
SLIGHTLY LOW: 40.0%	
SLIGHTLY HIGH: 33.3%	
HIGH: 6.7%	
VERY HIGH: 6.7%	

Figure 16. Responses to Questions #1,#3,#5,#6, and #7

8. Having mobility experts (logistics plans, transportation plans, combat plans, etc.) deployed with the unit is critical to successful mobilization in the field.

Responses/Second Iteration: 40.0% chose AGREE. 60.0% chose HIGHLY AGREE. See Figure 17.

Comments/First Iteration: "Mandatory for successful move."

"'Critical ' may be a little strong."

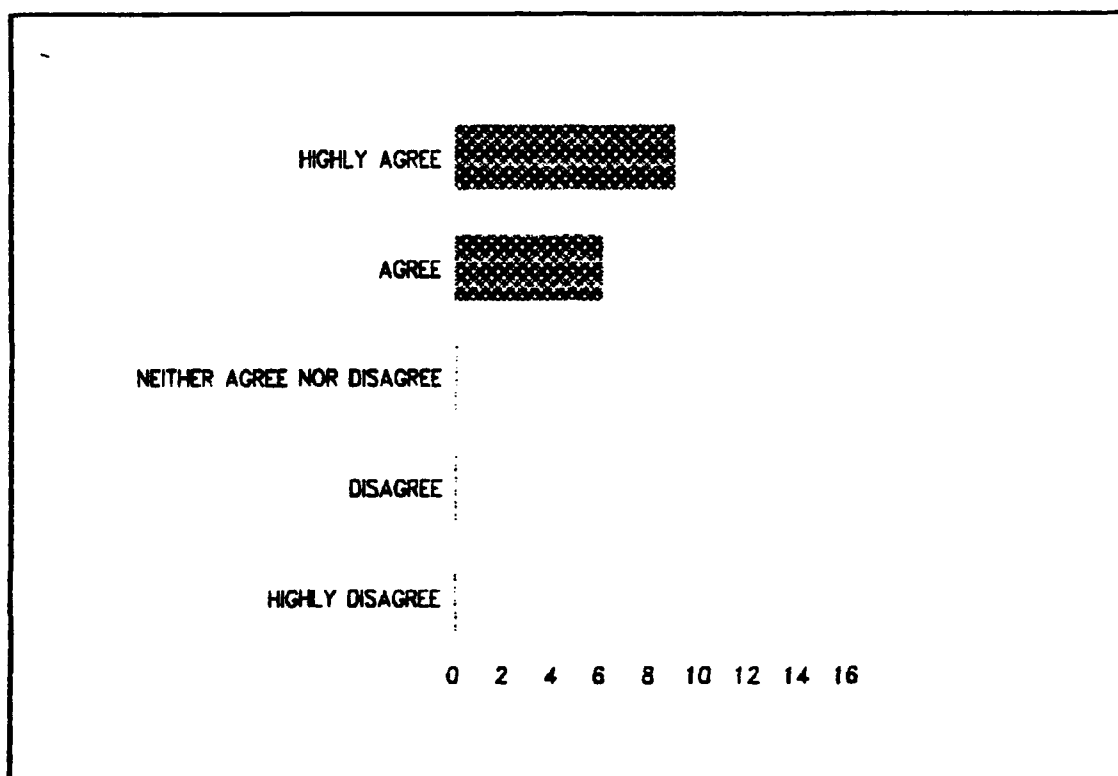


Figure 17. Responses to Question #8

"If you have done your preplanning, the person in charge should have no problem moving their people & equip. onward."

"Need an 'expert' to plan, organize, and take charge - need to start redeployment process immediately upon bedding down at new location."

"It will help temporarily or while there is a requirement for additional intra-theater mobilization."

"Proved during operations DESERT STORM and DESERT SHIELD."

"As in the above statement 'very critical' says it all. Leave the fighting to the big boys, and let log plans, trans, etc. worry about the rest."

"There is a great deal of work to be done by LGX folks in a full scale deployment like DESERT SHIELD/STORM. Coordination of assets, problems, and taskings are done best by 66XXs."

"A well trained unit could do a movement without a '--- plans' expert. Some units have problems even with a mobility expert because they don't follow guidance, or are determined to do it 'their way'."

"As one of a handful of loggies that actually deployed, employed, & redeployed into the AOR with their 'Aviation Package' in support of DESERT STORM/SHIELD, my expertise was critical to the success of the aerial port, airfield management, military customs insp, as well as mobility. In my opinion, the question now needing an answer is 'How many loggies?' vs 'Were loggies needed?'"

Comments/Second Iteration: "A Loggie is essential to pull the pieces together. Preplanning is fine but problems do occur that cannot be preplanned for."

"Pre-planning is important, but its not a substitute for having the right people to handle the inevitable problems. Both 'planning' and 'people' are tools, and both are necessary."

"We know where to go for movement info/assistance, how to assess requirements, etc."

"Things tend to get messed up when there isn't a Loggie to coord. actions. People left out of the loop and have to jump thru hoops to get things done."

"My deployment in theater during DESERT STORM/SHIELD was critical during the closures of our beddown site. With Logistics in place we turned the base back to the Host Nation 9 days after the last aircraft departed. Other bases still had USAF equipment and personnel there 2-8 weeks after the aircraft departed."

9. Mobilization of a squadron or wing within a theater of operations is essentially the same as from home station.

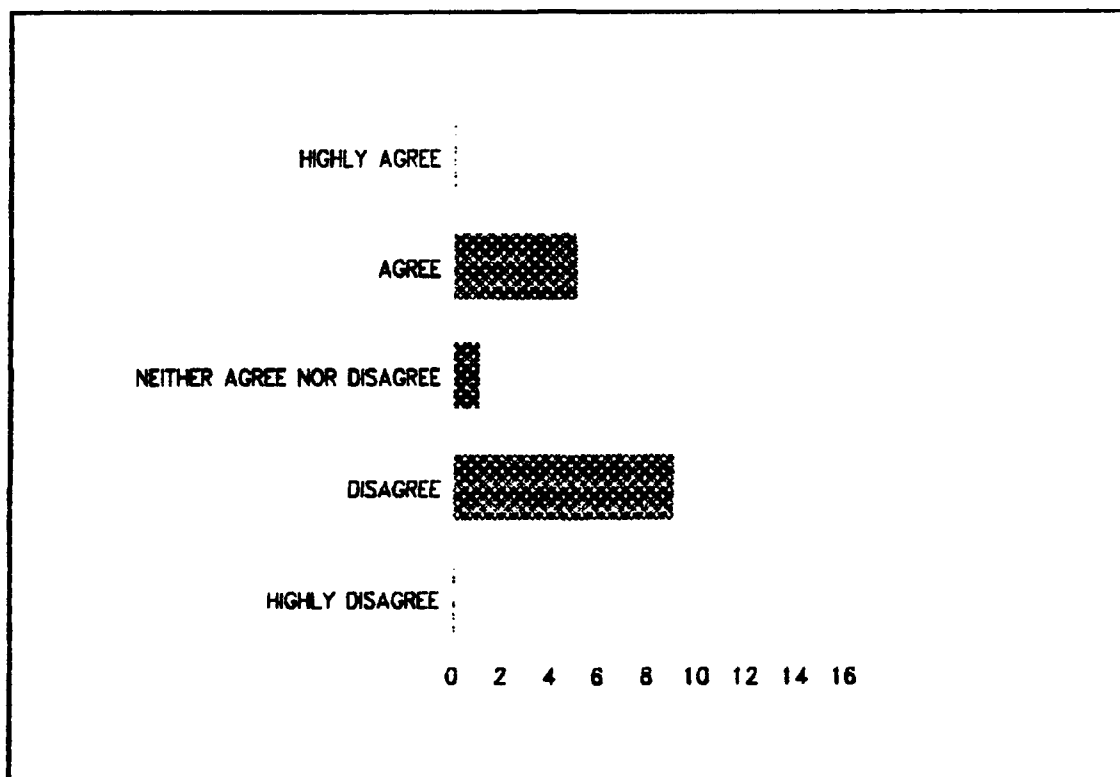


Figure 18. Responses to Question #9

Responses/Second Iteration: 60.0% chose DISAGREE. 6.7% chose NEITHER AGREE NOR DISAGREE. 33.3% chose AGREE. See Figure 18.

Comments/First Iteration: "I really don't know. I have never seen such a thing attempted."

"Not even close to being true. Take RAF Alconbury for example. Under 4102, we were to deploy our units to Collocated Operating Bases (COBs) in Germany, Norway, and England. At these COBs, we had a lot of prepositioned War Reserve Material. We had a helluva time getting our prepositioned assets in place in the desert."

"Don't have the resources (MHE), time or people (overhead who did not deploy) to assist."

"You probably won't have the same support structure at all deployment bases."

"During DESERT STORM our troops basically mobilized themselves intra-theater without extra coordination from the logistics plans section - since the equipment and personnel was previously prioritized and pre-planned."

"Stress factors are much higher when actually deployed. Morale is also a big player. People are burned out after being deployed. Having them redeploy to another location will impact them severely."

"Once away from home station, it becomes easier to mobilize."

"Provided services available are the same for intra-theater and home station moves."

"During DESERT STORM, it seemed like the time, energy and coordination I incurred getting one (1) Emergency Leave member home was more labor intensive than getting 15 KC-135s

and 260 pax [passengers] to the FOL [forward operating location]!"

"Surroundings, locations, points of contact, etc at home station gives a feeling of greater accomplishment."

Comments/Second Iteration: "Departure from other than home station can hardly be expected to have the team organization, infrastructure, or assets normally available at home station."

"Less packing req'd but new methods, people, diplomatic relations, etc to deal with."

10. The proposed system for intra-theater mobility, as shown in [FIGURE 7], accurately represents the basic actions needed for a unit to mobilize within a theater of operations.

Responses/Second Iteration: 13.3% chose NEITHER AGREE NOR DISAGREE. 80.0% chose AGREE. 6.7% chose HIGHLY AGREE. See Figure 19.

Comments/First Iteration: "Somewhat simplistic - i.e. what happens to people/equipment that do not 'redeploy'."

"Before you can identify equipment and personnel needed you need to know what is at new site; you need a site survey or data from a site survey."

"Is the entire unit deploying or a portion? If a portion, what will be needed to sustain both operations successfully? A lot of questions need to be answered. It's never as easy as your attachment 1."

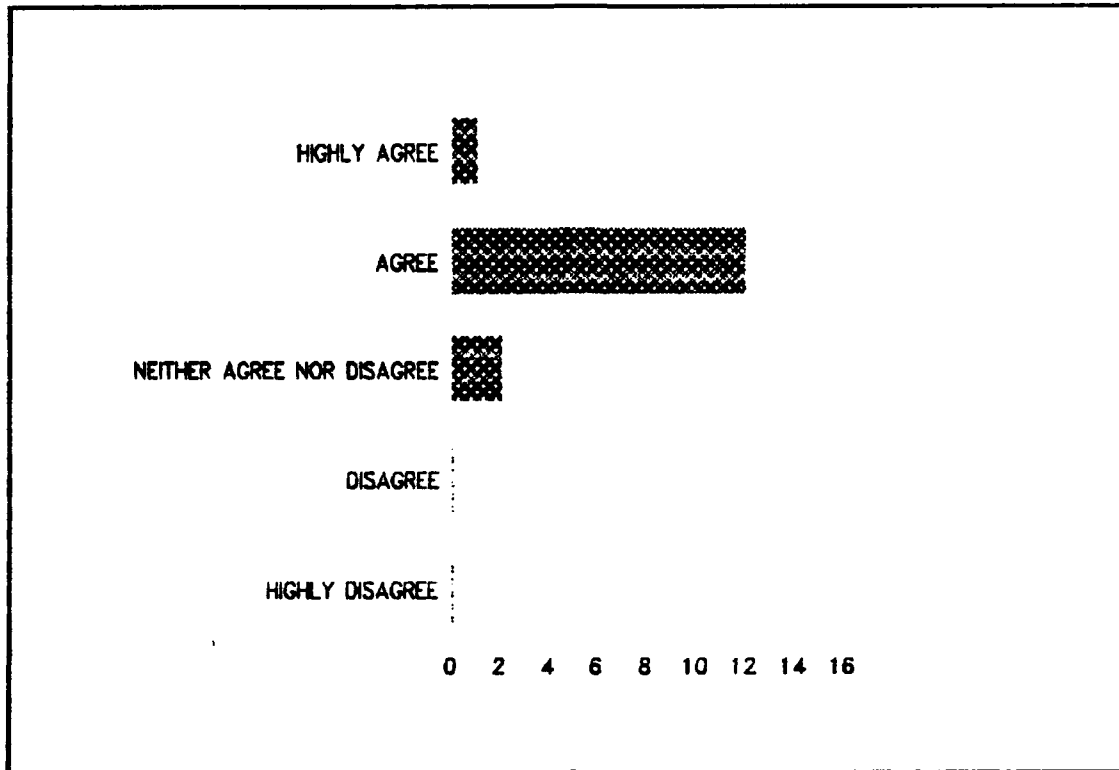


Figure 19. Responses to Question #10

"You need to insure you include the PERSCO [Personnel Support for Contingency Operations] interface which is the most important part of a redeployment for accountability."

"Tasked according to :

Mission Statement/DOC Statement

|

v

**Identify Equip./Personnel. Brief all
concerned**

|

v

Submit Shortfalls such as people on

leave/equipment dysfunctional.

|

v

Sequence of Events. Load Planning.

|

v

If time permits, do a prepassenger manifest and early in check for cargo. We usually have at least 7 days to prepare for deployments. If time does not permit, marshal cargo and people.

|

v

Load/Depart

"The attachment fails to limit the 'scope' of the tasking. I recommend manpower & equipment needs be identified w/in the scope of an established or newly created UTC."

"MISCAP [Mission Capability] statement should include exact operations expected at follow-on location."

Comments/Second Iteration: "Just how we deployed for DESERT SHIELD. One caveat: prep of equipment has to follow, at least to some degree, priority of movement. They are not separate/unrelated paths in the sense that they might appear to be independent. You can prep only so much so fast, so

working on prep must relate to shipment sequence to some degree."

"Basic actions -expect lots of changes as you go!"

"Agree with the exception of ID manpower and equipment req'd at next location. This is Host job to ID to me."

11. Would you add or delete actions from this system to make it more representative of reality? Please explain your decision.

Comments/First Iteration: "After identifying available assets you would have to source unavailable assets from other locations."

"No"

"No. I believe in keeping it simple and I believe this does it."

"Add action - see [#] 10 above. Also all equipment needs to be inspected for transportability and function (pre-marshalled)."

"I would add a step after mission statement to evaluate deployed site capability and resources (addressed in item 10)."

"It seems reasonable."

[Comments made in reference to the first two blocks of the model] "These steps need to be very indepth and accurate. How much time will there be to make an accurate assessment?"

"No."

"Add: know the window (earliest departure time or latest arrival time) at forward location or destination."

"Depending on how detailed you want to get. I would say that the flow chart is just about right."

"Add - acquisition of transport (deployment and redeployment)."

"A system can always be improved, but it is good now."

"No"

"Yes please see Q[uestion] 10."

"OK. As-is."

Comments/Second Iteration: "OK as is. Some more work actions might be eliminated."

"Leave it simple - too much detail in the system diagram will get folks wrapped up on following it instead of adapting to the issues that will invariably come up."

12. For a unit mobilization within a theater of operations, rate the level of importance for the following actions (A through G), as performed by the deploying unit:

A. Action: Physically prepare equipment for transport

Responses/Second Iteration: 80.0% chose HIGH.
20.0% chose VERY HIGH. See Figure 20.

B. Action: Maintain internal coordination and control of mobility operations.

Responses/Second Iteration: 40.0% chose HIGH.
60.0% chose VERY HIGH. See Figure 21.

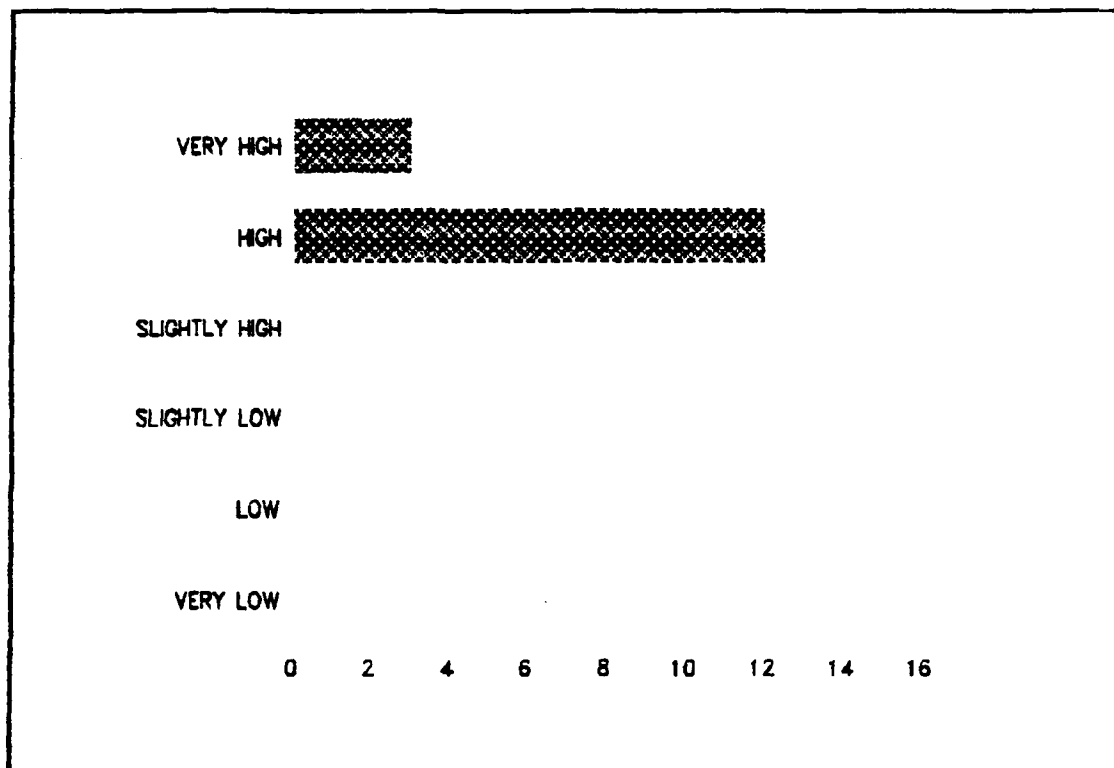


Figure 20. Responses to Question #12A

C. Action: Marshall cargo and assemble personnel.

Responses/Second Iteration: 73.3% chose HIGH.
26.7% chose VERY HIGH. See Figure 22.

D. Action: Load transports.

Responses/Second Iteration: 6.7% chose SLIGHTLY
LOW. 33.3% chose SLIGHTLY HIGH. 46.7% chose HIGH. 13.3%
chose VERY HIGH. See Figure 23.

E. Action: Prioritize and sequence equipment/personnel.

Responses/Second Iteration: 13.3% chose SLIGHTLY
HIGH. 66.7% chose HIGH. 20.0% chose VERY HIGH. Figure 24.

F. Action: Identify equipment and personnel to be
mobilized.

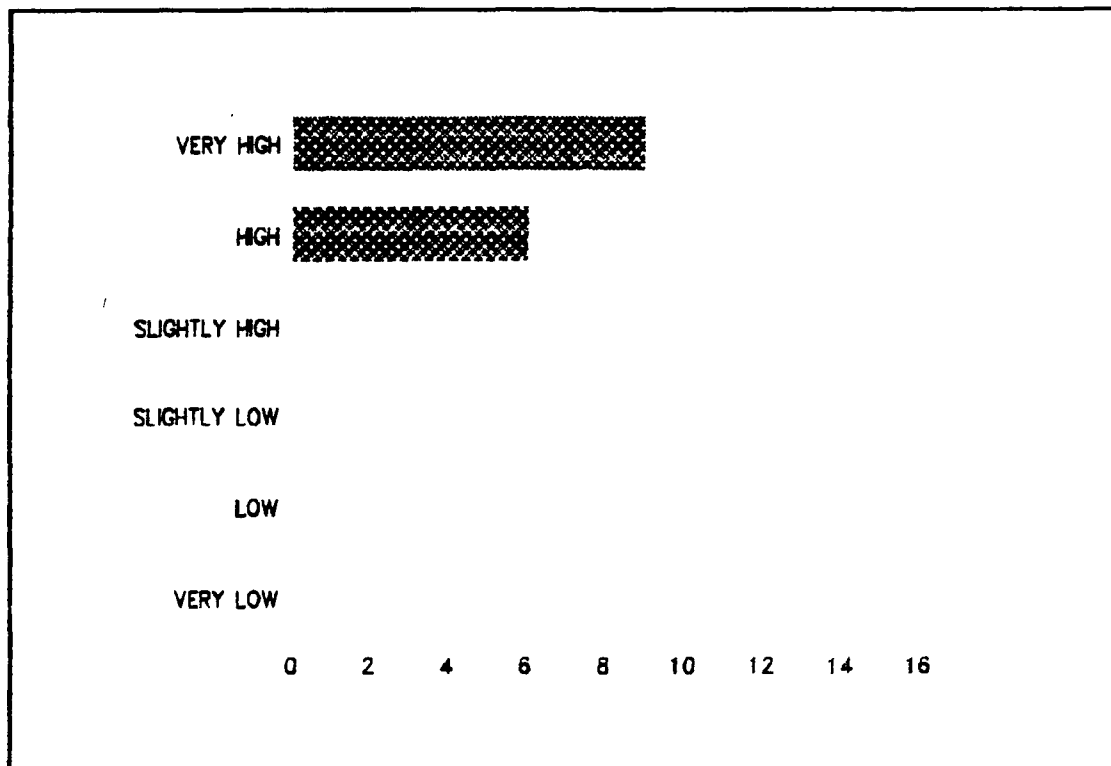


Figure 21. Responses to Question #12B

Responses/Second Iteration: 66.7% HIGH. 33.3% chose VERY HIGH. See Figure 25.

G. Action: Allocate cargo and passengers to available aircraft loads, trucks, or other transports.

Responses: 6.7% chose SLIGHTLY LOW. 73.3% chose HIGH. 20.0% chose VERY HIGH. See Figure 26.

13. Comment on the relative importance of these actions [see FIGURE 7] to intra-theater mobility. Are any significantly more or less important for success than the others? If so, explain.

Comments/First Iteration: "All are very important. No significant differences."

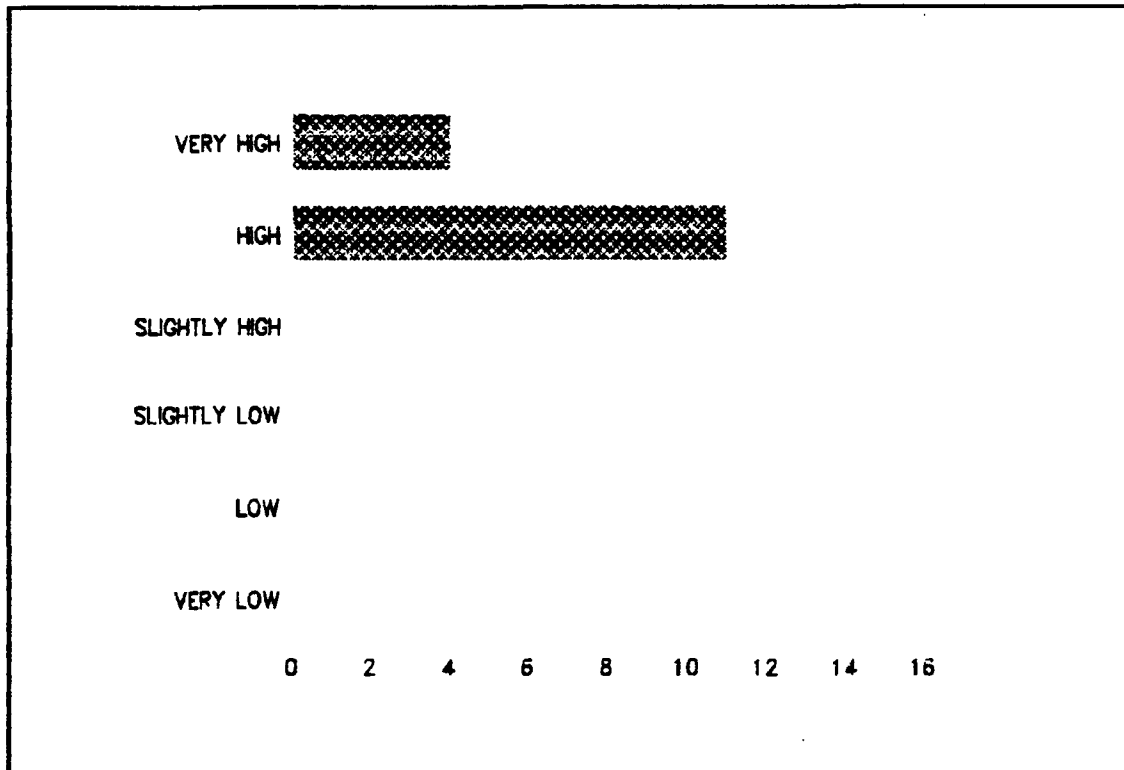


Figure 22. Responses to Question #12C

"Not really since all pertain directly to movement of assets."

"If you do the preplanning of getting the people & cargo ready for a deployment the processing & loading should be routine & easy."

"Identifying and preparing are probably the most important."

"All are about same relative importance - if one action 'falls through the cracks' the whole system could fail or not meet closure."

"Prioritizing/sequencing and allocating to airlift are not as important as other steps if sufficient airlift is available to move assets within a reasonable time."

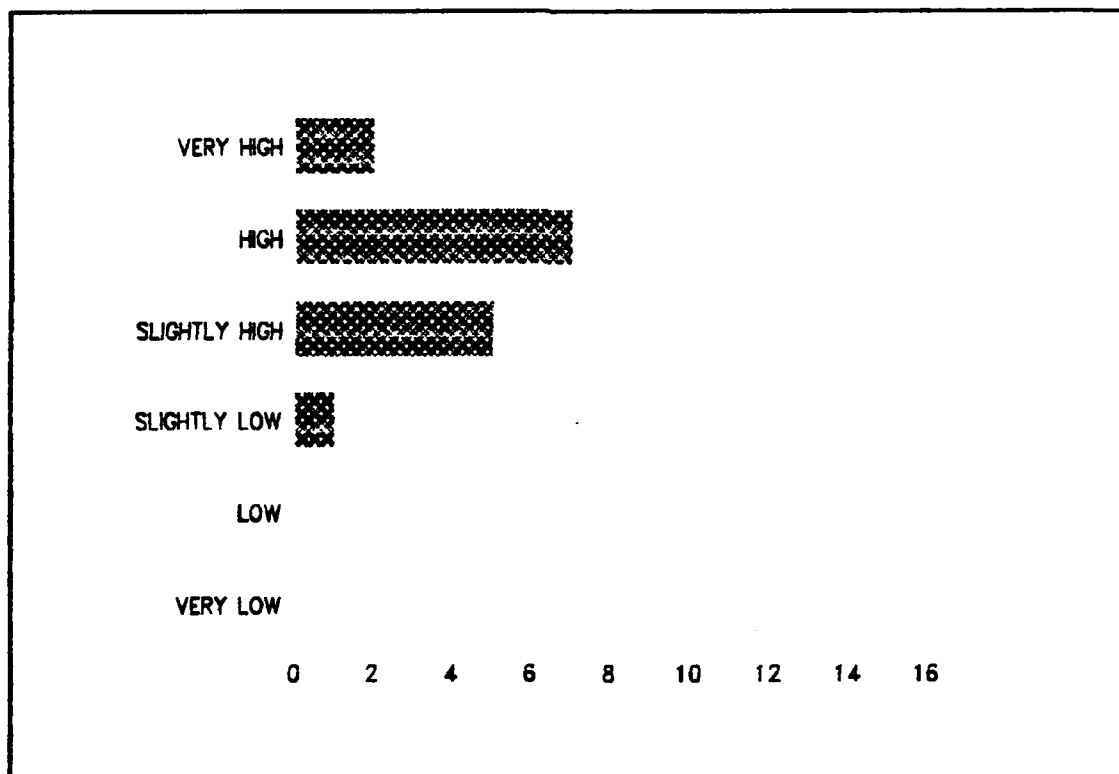


Figure 23. Responses to Question #12D

"If it were simplified and standardize; mobility would be very logical. Identifying personnel and equipment is very important. Without it, you may find yourself fighting a war you can't win. If you forgot a bomb loader, how could you drop bombs? So - we identify and submit shortfalls and limiting factors. The internal coordination is necessary, but it is a known fact that mobility is a hectic game. It is never done the same way twice. Therefore, internal coordination is necessary, but the individual involved must be flexible and is only really concerned about getting people and cargo out in a safe and timely manner. Logic and order do not appear to be a common link in Air Force mobility.

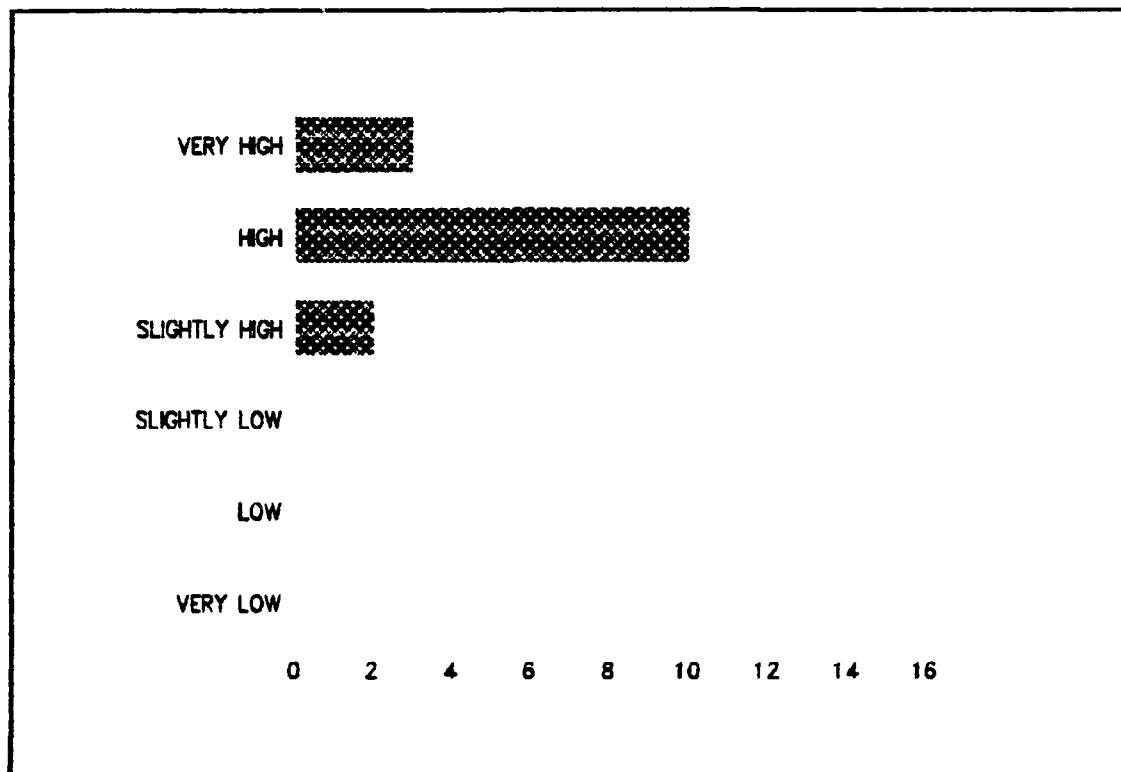


Figure 24. Responses to Question #12E

Allocation of trucks and people to aircraft is of grave importance. Load plans must be made so a proper center of balance is established and the right stuff gets to the right place at the right time."

"Equally important."

"All are equal actions."

Comments/Second Iteration: "People and cargo selection/preparation are most critical."

"All actions are important. However, the better the pre-planning the more successful the execution."

"The type/mode of transport is critical for determining the priority of assets and personnel - You have to know if you can move with the transport provided."

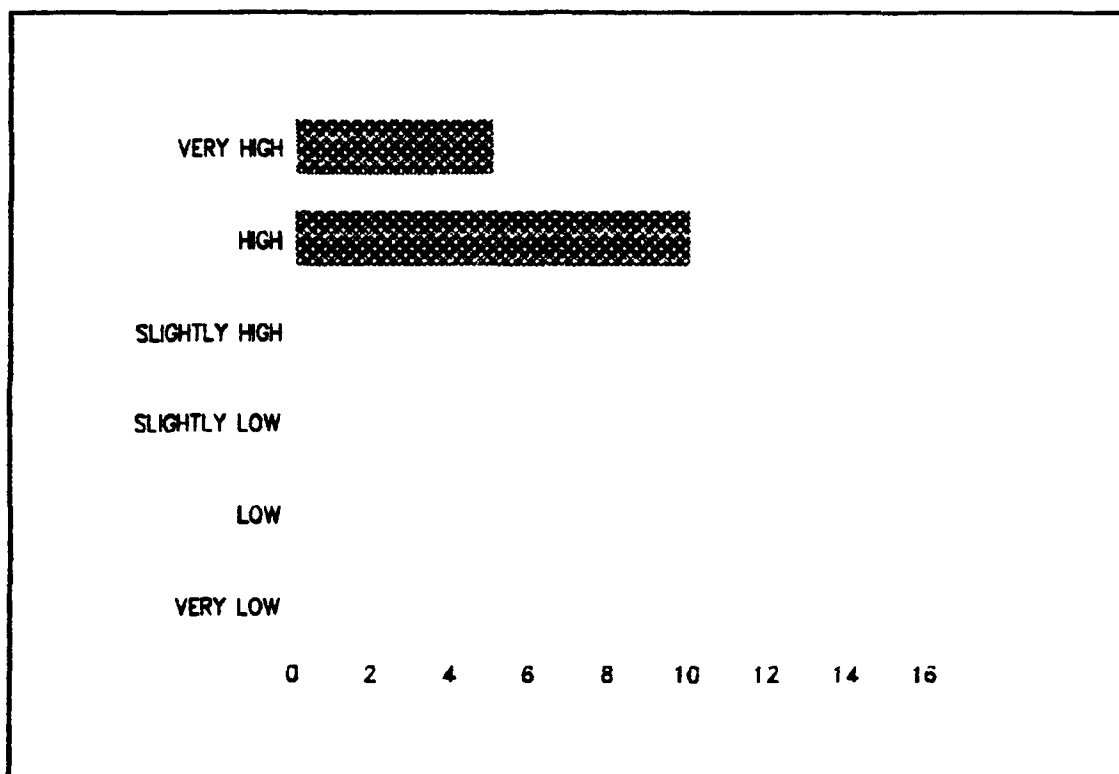


Figure 25. Responses to Question #12F

"Weakness early is hard to compensate for later on. The planning and organizing prior are the make/break until late in the flow, by which time you may have overcome planning deficiencies (or you'll be buried 10 chucks deep). Remember an intra-theater deployment is done without the large team of experience and system support of home station."

"Agree that if preplanning of getting people and cargo ready for deployment the rest should be routine and easy."

"I still think that ID of prepositioned or whats req'd on other end is not my job."

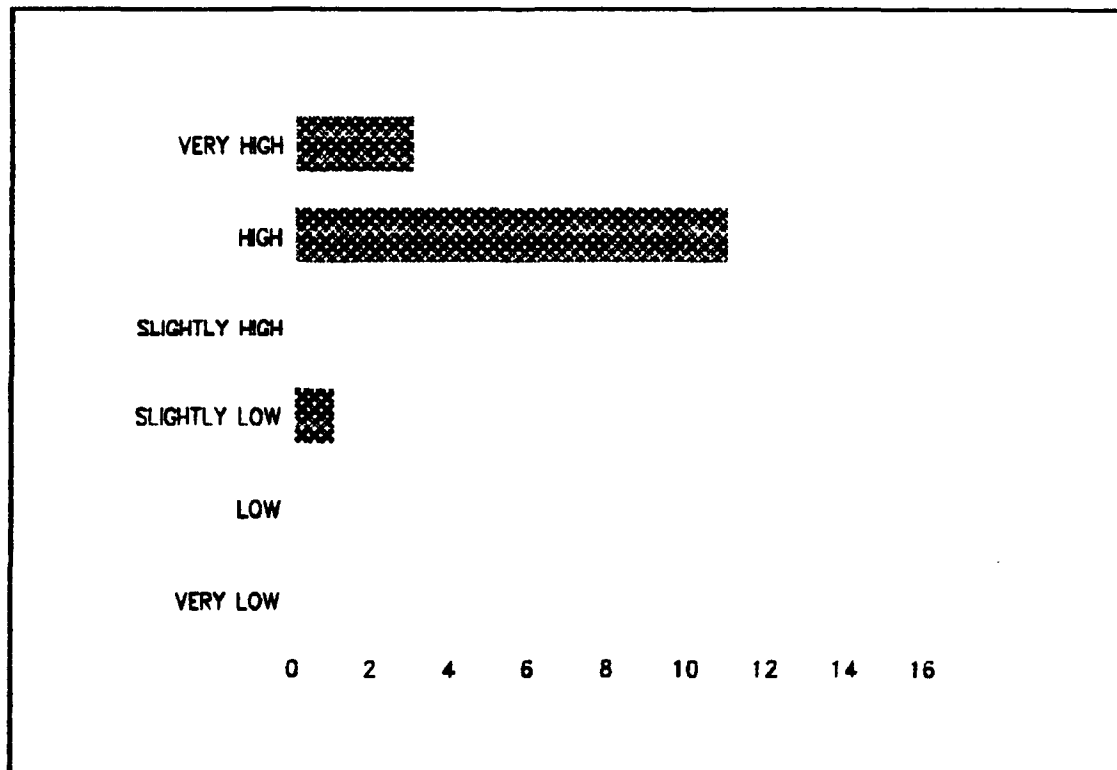


Figure 26. Responses to Question #12G

14. During war, an intra-theater mobilization is more likely to operate with fewer resources, shorter lead times, and in a more unpredictable environment than a wartime mobilization from home station.

Responses/Second Iteration: 26.7% chose AGREE. 73.3% chose HIGHLY AGREE. See Figure 27.

Comments/First Iteration: "The inability to communicate effectively in a wartime environment is a very significant problem."

"Agree! Everyone wants to get a piece of the action and everyone is working out of their own element. Communication, command and control are usually deteriorated and people become pack rats during the war."

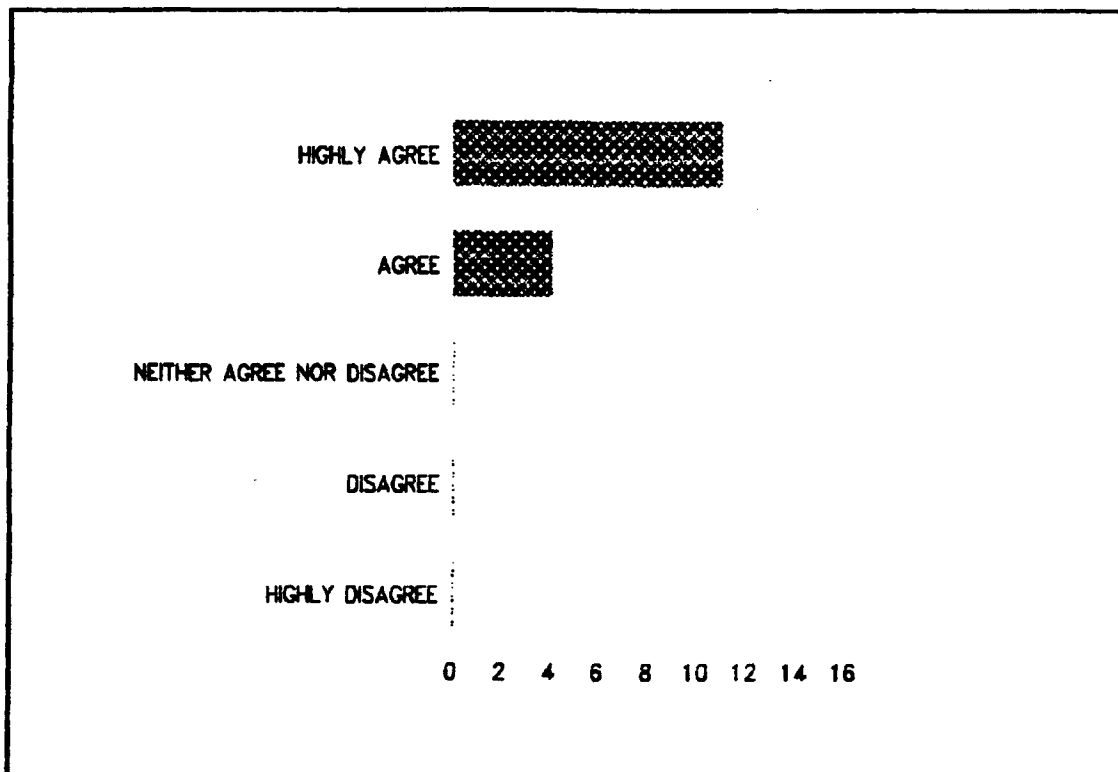


Figure 27. Responses to Question #14

"Normal frag's, levies, etc are most times replaced with telecon's."

Comments/Second Iteration: "You do what you have to do to get the job done regardless of written procedures."

"Too many unknowns and variables during actual wartime scenario intra-theater. Intra-theater is a more 'seat of your pants' operation."

"Everything is there or not there. You either get airlift or you don't."

"Shorter response times. Loads increased."

15. A unit already in the field can pick up and move again without having mobility personnel available to direct and

coordinate activity as well as it can with mobility personnel available to direct and coordinate activity.

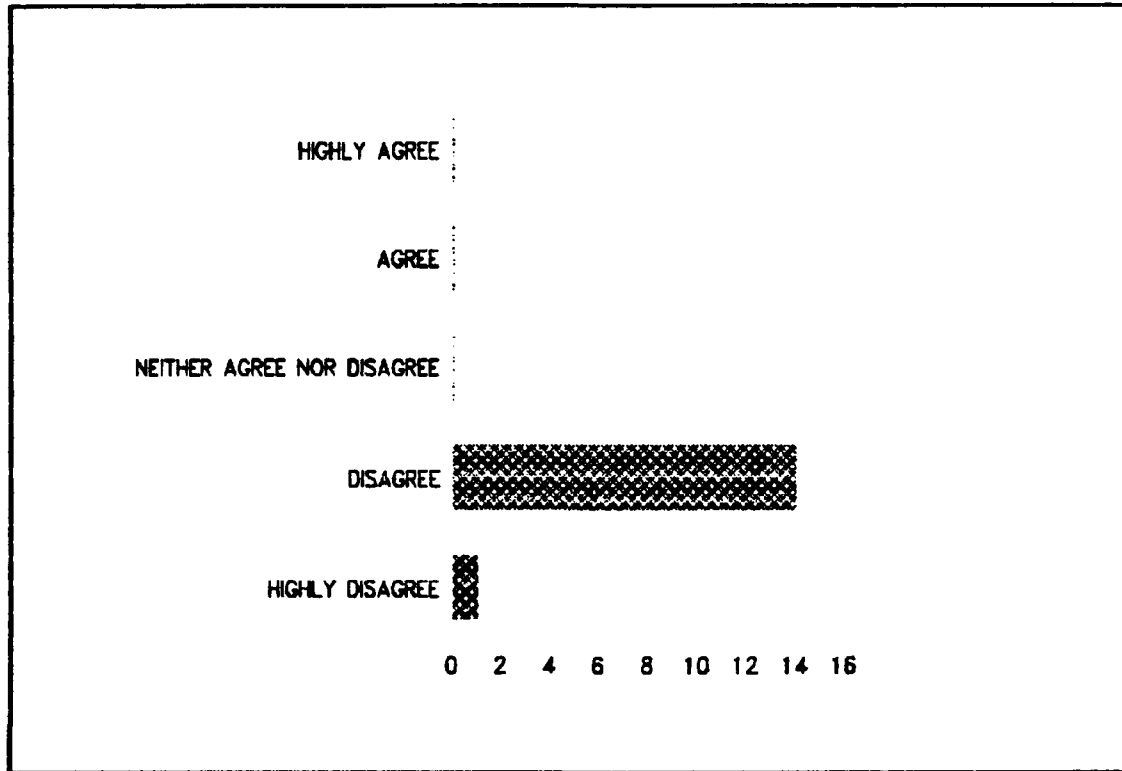


Figure 28. Responses to Question #15

Responses/Second Iteration: 6.7% chose HIGHLY DISAGREE.
93.3% chose DISAGREE. See Figure 28.

Comments/First Iteration: "Normally the people on mobility are not trained in redeployment assistance team (RAT) requirements."

"To a particular level its always better to have mobility personnel, but the job can be performed without them with no significant impact."

"Needs to be planned & organized or else a real mess could be the outcome - equipment/people left behind."

"It depends on the personnel within the unit and the kind of unit it is. Some medical units are better at picking up and moving than are some transport units. If 'deployment' or similar verbiage is part of the unit's mission statement and the commander has the unit train for it, then they will do well because they will think mobility and be ready to package equipment/supplies for movement. Otherwise the unit will 'homestead'."

"While a unit could move itself by using the originally planned schedules and paper work it is much more difficult. LOG planners are essential in coordinating schedules and planning the redeployment leaving OPS planners free to accomplish their jobs of fighting the war."

"I think its even more important to have mobility personnel available in the field."

"As problems occur and changes in airlift or mode of transport changes, mobility personnel are extremely important. Units in the field can expect these changes and problems."

"Logistics is, contrary to the prima donna (spelled pilots), is the most important function for the success of the war. Loggies are excellent at being able to see the big picture and we make it happen. Then, the pilots can do their magic.

Read about the Russian military! Loggies are the prima donnas in their forces."

"Give me a break!"

"Most units can accomplish task, but with some difficulty. Proper direction and coordination can ease operations and prevent confusion."

Comments/Second Iteration: "Need a POC [point of contact] to coordinate mobility activities w/o such a person/team the priorities of personnel and equipment moves would be lost."

"Mobility personnel have the whole picture and are looking for total success, not 'my people and equipment first'."

"It would be desirable to have enough mobility personnel intra-theater. However, it is somewhat cost prohibitive with all the deployed locations to have sufficient numbers of mobility personnel at each and every location."

"Let the experts handle it! (Log plans types)."

"Depends on how good at it they were on the first leg!"

16. Rank the following as tools for allocating assets to transports in an intra-theater environment.

Responses/Second Iteration: 86.7% chose CALM as the best tool. 13.3% chose RESIDENT EXPERTISE as the best tool. See Figure 29.

17. Are the available tools for allocating assets to transports good enough? If not, how could they be improved?

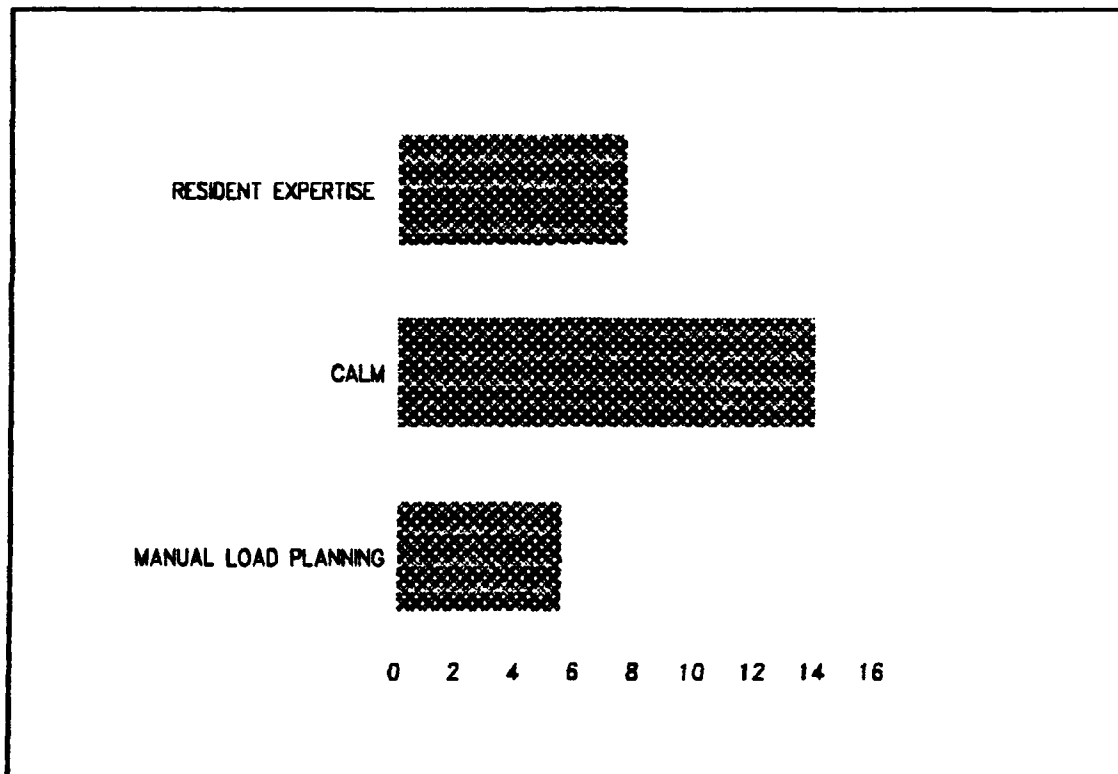


Figure 29. Weighted Rankings for Question #16

Comments/First Iteration: "'CALM' needs better graphics and a more user friendly format; but, the concept is valid and the program does work."

"CALM locks up quite often. Requires too much saving."

"yes"

"They are sufficient."

"Yes. Load planning has become a science unlike other parts of the mobility machine i.e. processing of cargo and personnel."

"Version 4.0 CALM still has some bugs and limitations in it but you can work around it. CALM 5.0 was the most useful if it would not keep crashing."

"I have had great success in manual load planning."

"A. CALM on a field (portable) hardened lap top computer which will work in the desert as well as arctic as well as rain forests.

B. All inclusive checklist that a 'newby' could understand and run.

C. Simple numbering system for whatever cargo/PAX that's moving.

D. Simple scheduling tool/form for cargo/PAX movement.

E. Field lap top computer with data base which could sort and select by chalk, name, rank, AFSC, func, inc #, haz codes, spec load codes, etc."

"How well do computers work in the field? The big unknown."

"If at all possible CALM should be integrated with the SBSS system to allow the document officially to transfer supplies and equipment to the receiving COS."

"No. CALM needs to be improved - locks up computer."

"It would be good to standardize fighting forces. Then we could use bar coding and what not to develop preplans, loading and incheck.

Nothing can beat hands-on experience. Computers break and people need to understand basic stubby pencil procedures.

Micro-circuit Technology in Logistics Applications (MITLA) is an excellent program for bar coded transportation functions."

"Yes"

"I would say the 'tools' are there but what good are they if you don't have enough people to make the system work?"

"Current 5.0 Version is adequate. Software requires update to allow TCN number."

Comments/Second Iteration: "CALM 5's bugs are well known. Maybe 5.1 & 6.0 will release some day."

"CALM needs to be improved."

"CALM for laptop computers has some software problems that need to be resolved. The laptops in a harsh environment are weak."

"In a 'Planners' mind they are good enough, but the question should be raised to Loadmasters and Transporters."

"OK as is."

"Yes"

"An expert can always make something fit that could be outside the realm of paper or computer."

"CALM is nice but takes too time to load data and has a few glitches - but better than stubby pencil."

18. Rank the following as tools for identifying equipment for deployment in an intra-theater environment. This question focuses on the process of determining equipment requirements as well as identifying actual equipment items to fill those requirements.

Responses/Second Iteration: 57.2% chose COPIES OF LOAD & PACKING LISTS as the best tool. 21.4% chose CHECKLISTS as

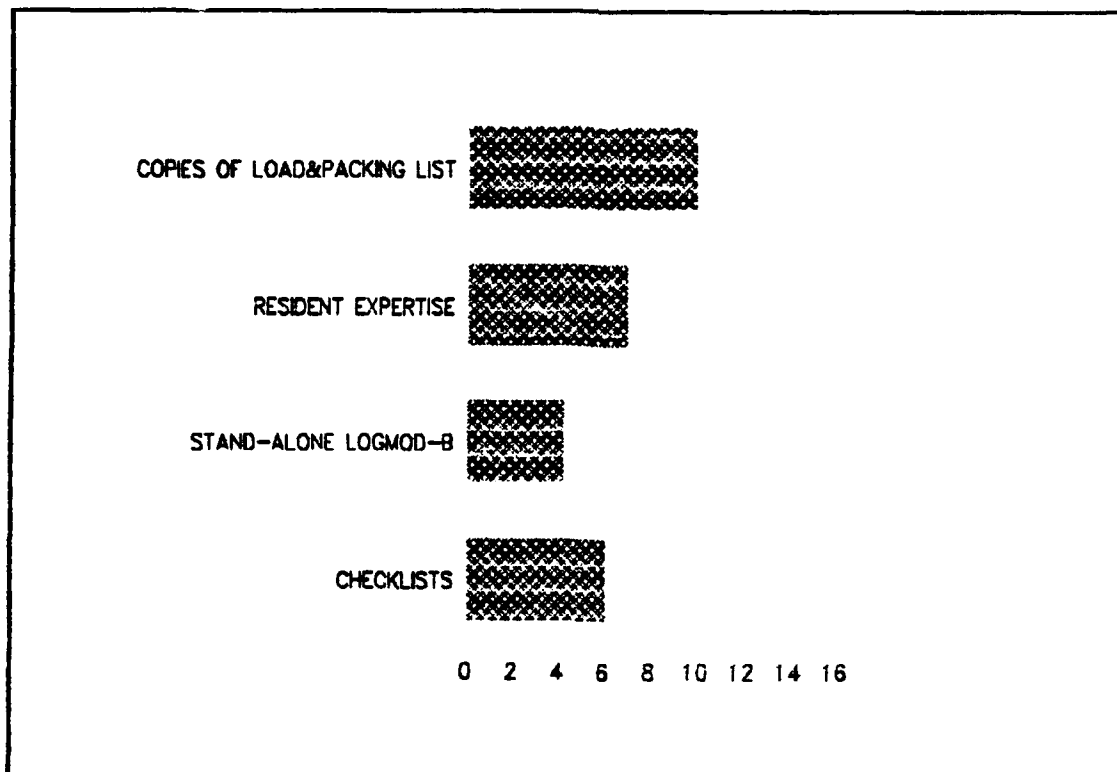


Figure 30. Weighted Rankings for Question #18

the best tool. 21.4% chose RESIDENT EXPERTISE as the best tool. See Figure 30.

19. Are the available tools for identifying equipment for deployment good enough? If not, how could they be improved?

Comments/First Iteration: "No - Computerized systems need to be more user friendly. Data entry to update the database is too complex & labor intensive."

"Schedule of Events (preplanned) are also used."

"Yes"

"If you are able to get the 'stand-alone LOGMOD-B' up & running I would say you have a very good chance."

"They are sufficient."

"Yes"

"Not too familiar with the Stand-alone LOGMOD-B."

"A. Site Survey - most valuable

B. Communication with those at site - valuable - telephone, telefax, message, letter

C. Table of Allowances, non-WSTA's, LOGDET are ok as long as flexibility is permitted to meet the current situation."

"Yes if used correctly."

"Yes"

"Yes, they are good enough. We need to do two things. Become more computer oriented by using programs like MITLA. Develop the programs closer to the way Marines fight. They ARE mobility and we can learn from them."

"Yes"

"Present system adequate."

Comments/Second Iteration: "No opinion."

"Sufficient."

"More user friendly software. Better capability between COMPES, CALM, and AMSOE data bases."

"No. Improved computer (field) - improved software - more user friendly."

"New software."

"Stand alone will become my best choice once its reliable. 1) Not enough computers available (sometimes non-existent!). 2) I've not even seen stand-alone LOGMOD-B yet - can't count on it."

20. Rank the following as tools for identifying personnel for deployment in an intra-theater environment. This question focuses on the process of determining manpower requirements as well as identifying actual personnel items to fill those requirements.

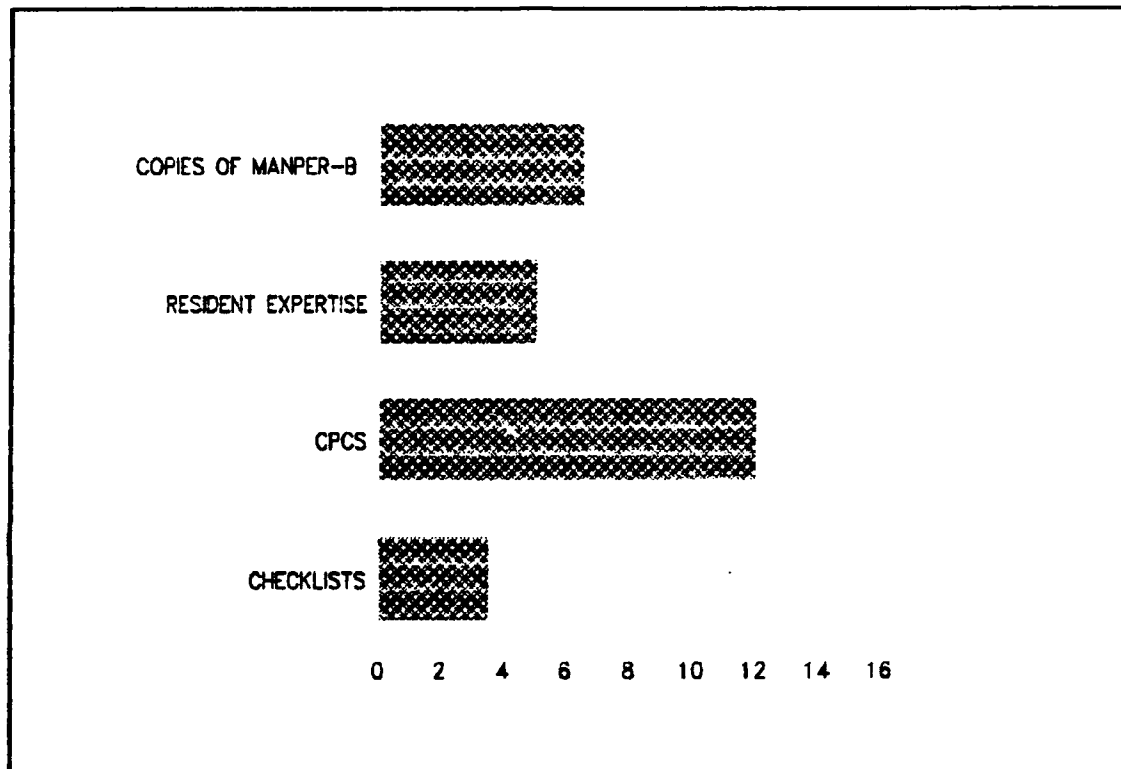


Figure 31. Weighted Rankings for Question #20

Responses/Second Iteration: 78.6% chose CPCS as the best tool. 14.3% chose COPIES OF MANPER-B as the best tool. 7.1%: RESIDENT EXPERTISE as the best tool. See Figure 31.

21. Are the available tools for identifying personnel for deployment good enough? If not, how could they be improved?

Comments/First Iteration: "The CPCS has so far proven to be unreliable for the task."

"We use DRDs [Deployment Requirements Documents] to pre-plan personnel. They are filled out with names, etc. at the time of execution."

"CPCS is totally inadequate in both capability and speed. It is a useless system for real time processing (mobility/deployment) of personnel & is complex and cumbersome. The software lacks flexibility & is not user friendly. Of the shelf DBASE IV works much better when a simple personnel data base is prepared, or tailored, for the tasks.

"Yes"

"They are sufficient."

"Yes"

"We are a reserve unit. Normally the tasking equals the manning document; thus, if the person filling the slot on the manning document is qualified, then that person deploys.

Simple software is sort & select crossing unit lines to find qualified personnel to fill tasking."

"You always need to know your objective first so you must begin with an OPORD, PAR and tailor from your hard copies and then proceed."

"Yes"

"Present system adequate."

"There should be a better way of doing business. There should be a system that the units can upload and download at the unit level.

Orders get all fouled-up if one change needs to be made.

On a tangent here. My personal opinion is that the armed forces should standardize rank, wrenches, parts, fuel, mobility, uniforms etc. While we are in a streamlining mode, we should revolutionize the forces."

"Yes"

"Yes"

"By making the CPCS system compatible w/AMSOE and COMPES!"

Comments/Second Iteration: "Computer and software improvement."

"By making CPCS compatible with AMSOE and COMPES."

"PERSCO personnel need better training on the CPCS to make it an effective management and mobility tool."

"Unfamiliar with CPCS - not qualified to judge this system."

"Yes, if everyone does their homework."

"No opinion."

"Yes, but ... CPCS is not always available. DRD's are most common as a substitute."

"We need to do away with MRRR's. Take a downloaded DRD and use copies as your manning rosters."

22. Rank the following as tools for prioritizing and sequencing personnel and equipment in an intra-theater environment.

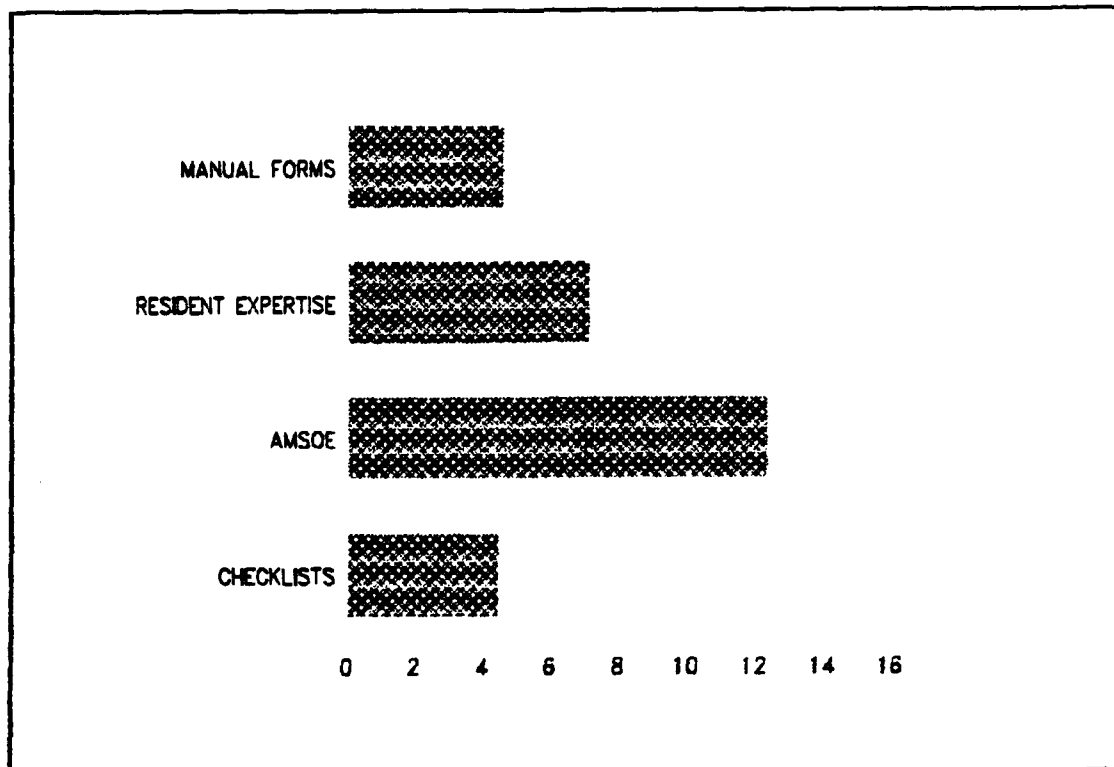


Figure 32. Weighted Rankings for Question #22

Responses/Second Iteration: 73.3% chose AMSOE as the best tool. 13.3% chose RESIDENT EXPERTISE as the best tool. 6.7% chose CHECKLISTS as the best tool. 6.7% chose MANUAL FORMS. See Figure 32.

23. Are the available tools for prioritizing and sequencing personnel and equipment good enough? If not, how could they be improved?

Comments/First Iteration: "No; AMSOE is a joke. A simple computer system operating LOTUS 1-2-3 or ENABLE spreadsheet software is much simpler and more powerful. AMSOE is much too complex and is not at all user friendly. Why?

"Yes."

"Yes"

"Yes"

"They are sufficient."

"Yes"

"Have not dealt with AMSOE except at the school house, but I felt it worked well there."

"A. Prioritizing cargo done by loadplanning.

B. Prioritizing pax done by chalking in loadplanning then adding to CPCS.

C. Then taking a + b above and putting times to them to create an SOE.

D. SORT and SELECT of pax and equ done on a laptop computer. Sort by rank, name, AFSC, gender, sec clearance, spec quals, inc nbr, wt, dimension data, hazard codes, tailor keys, spec handling, etc."

"No. While at LZ-32 in the UAE everyone laughed because as soon as we landed I had my staff begin writing a Mobility Plan. Upon a follow on tasking requiring redeployment of 17 C-130s and 380 personnel for 17 days, we found our operation using a Deployed Mobility Plan enhanced our ability to deploy quickly and efficiently in short notice and regular circumstances. Everyone knowing how to 'get out of town' in a strange environment helped."

"Yes"

"Yes. But it will always take the human ability to tweek and tune the machines."

"No - We use expertise of ALCE, or mission commander to determine what he wants - no system developed."

"Present system adequate."

Comments/Second Iteration: "AMSOE is great. If you can't use AMSOE, you shouldn't be allowed near computers."

"AMSOE is here to stay. Individuals need to work with it until they become 'experts' at the program."

"AMSOE data base needs work. Current system is too labor intensive and time consuming - for rapid moves almost impossible to work effectively."

"AMSOE is not user friendly. I currently use an ENABLE spreadsheet which is much simpler."

"AMSOE is a lot less functional than it could be if further development were pursued. Its 'OK' as-is, but needs expansion and refinement."

"AMSOE is too slow to make quick changes needed during the early hours of a deployment. Too much info. has to be entered. Have to use mass change on MPN and ULN changes. This takes forever."

"No one would only use resident expertise. Use it in conjunction with other things."

"AMSOE isn't helpful for intratheater movement, but then it wasn't designed to be. AMSOE isn't user friendly because it was designed by a programmer, not a user. It also has other serious limitations. Use of other software is dependent on the person who uses it and their own skills."

"They are sufficient with expert advise."

"I like to use AMSOE but computer availability is a problem. Usually end up w/stubby pencil."

24. Rank the following as tools for physical preparation of equipment for transport in an intra-theater environment.

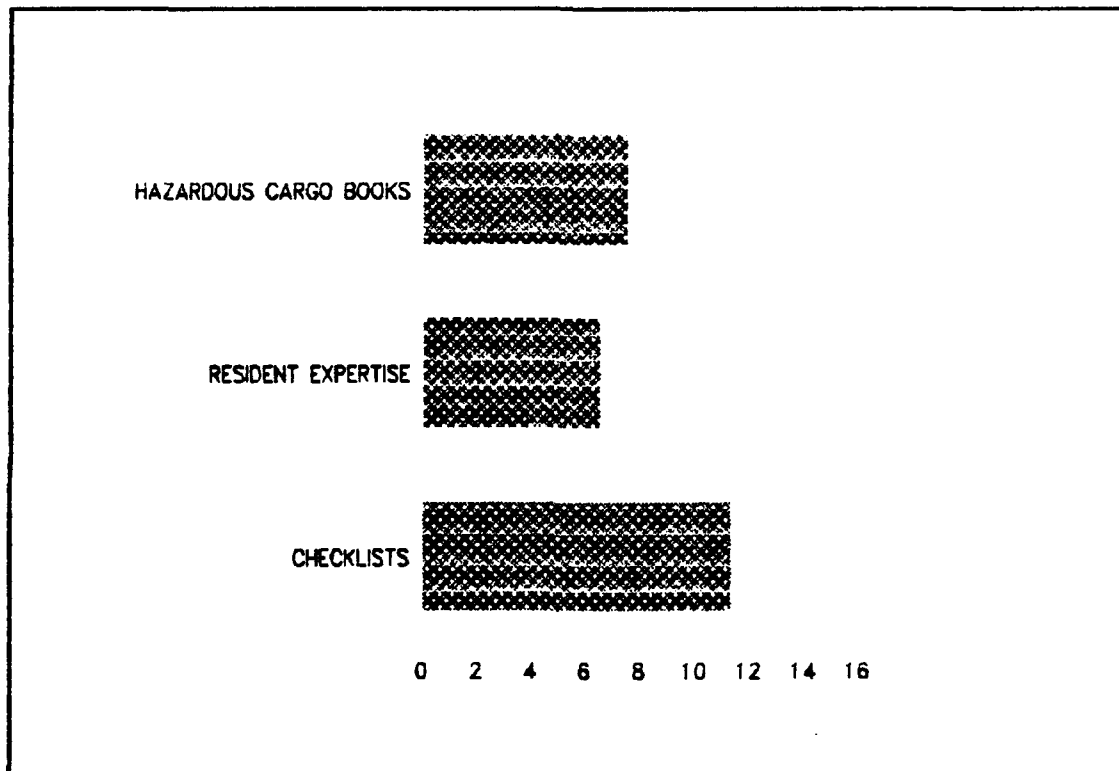


Figure 33. Weighted Rankings for Question #24

Responses/Second Iteration: 64.3% chose CHECKLISTS as the best tool. 21.4% chose HAZARDOUS CARGO BOOKS as the best tool. 14.3% chose RESIDENT EXPERTISE as the best. See Figure 33.

25. Are the available tools for physical preparation of equipment for transport good enough? If not, how could they be improved?

Comments/First Iteration: "We need a simple computer program to effectively work hazardous cargo problems. Design a software package that simply permits the user to enter the name (& critical info) of the hazardous material to obtain guidance for its shipment.

"Yes."

"Yes"

"No. There has got to be a faster way of processing cargo."

"They are sufficient."

"Yes"

"1. All inclusive checklist.

2. Packing list software (simplified) on laptop computer

3. -2 software on laptop computer"

"Yes"

"Yes"

"Training, training, training.

Exercise, exercise, exercise. OK. OK after Congress is done with us, I should say: Training and exercise."

"Yes"

"Present system adequate."

Comments/Second Iteration: "Hands on training is the best way. Get out and do it."

"The first consideration is safety (which means -2s). Second is proper tie-down and making sure it fits on/in the transport. Based on this, the 2133 Joint Inspection form is a quick easy checklist."

"Training and exercise are the best tools."

"Duty section weighs the item. Unit weighs the item. LGTX weighs the item. Overkill, no? All this on scales with tolerances that are a mile wide - any of the weights could be used. Length, width, and height measurements: three groups do that, too. If an inch or so difference, lots of folks are upset and Center of Balance mark moves maybe an inch. When it goes to the aircraft, the loadie looks at station marks 10 inches apart on the wall, looks from 10 feet away, squints, and guesses the fuselage station of that piece of masking tape. Was all the 1 inch difference really worth it? No."

"A bar code reader could speed up the processing data such that all dimensional data and hazard codes could be read directly into CALM for load planning."

"There are a lot of 'unknowns' when it comes to surface transportation. The Air Force needs to improve guidance in regards to surface transportation - i.e. what is the proper way to tie-down equipment to trailers?"

"No opinion."

"Procedures are out there. People need to comply."

"There is a faster way of processing cargo under 'development' at Wright-Patt. Why can't we see this

computer system in the field? (The automated personnel and cargo processing) -card with chip and reader.

"Somewhat. Again- computer availability is a problem. Checklists suffice. Training therefore is crucial!"

26. Rank the following as tools for physical preparation of personnel for transport in an intra-theater environment.

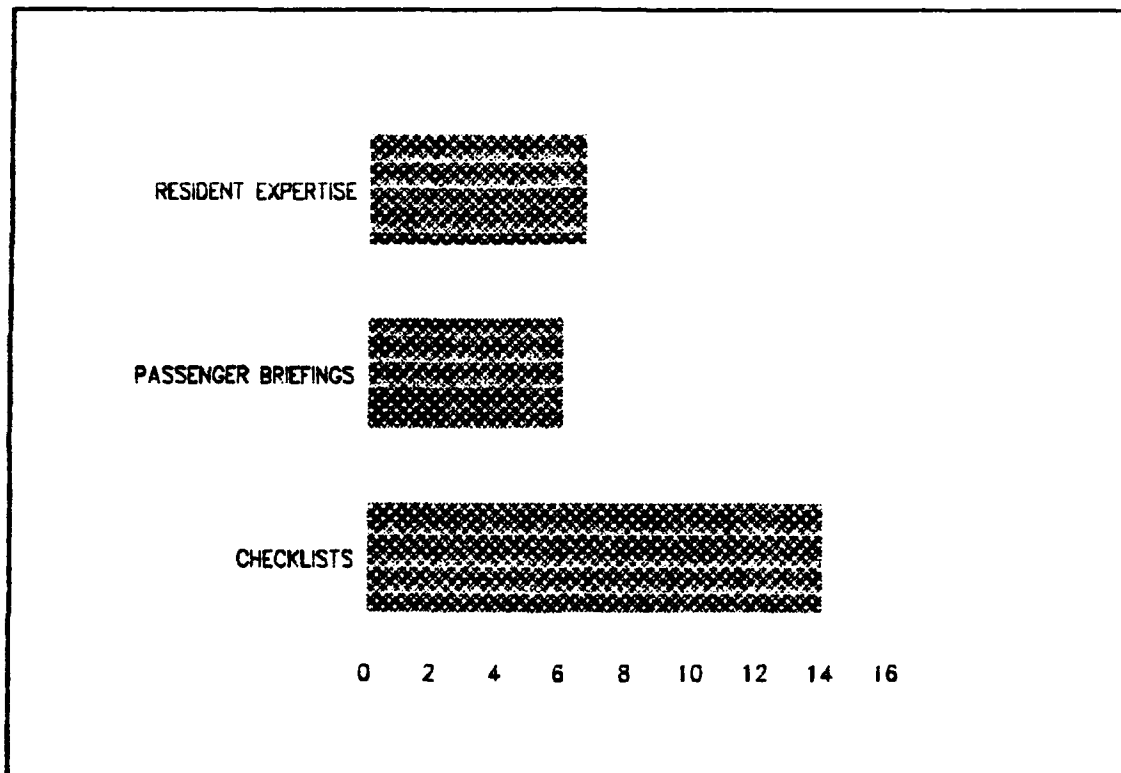


Figure 34. Weighted Rankings for Question #26

Responses/Second Iteration: 86.7% chose CHECKLISTS as the best tool. 6.7% chose RESIDENT EXPERTISE as the best tool. 6.7% chose PASSENGER BRIEFINGS. See Figure 34.

27. Are the available tools for physical preparation of personnel for transport good enough? If not, how could they be improved?

Comments/First Iteration: "The briefings are essentially a waste of time. The info required in the briefings to be briefed is of little or no consequence. Why do it? Briefings are most effective when MAJCOM guidance is tossed out and the briefing becomes a simple dialogue passengers and PAX rep [passenger processing representative]."

"Yes. Pax briefs should be mandatory for all personnel."

"Yes"

"No. There must be a way to speed up processing of personnel."

"They are sufficient."

"Yes"

"Individual responsibility is a must. The best tools are a individual responsibility checklist and a mean commander with a big hammer who takes his job seriously."

"Yes"

"Yes"

"No. People would benefit by being forced to update wills, get shots, check their form 93s."

We have managed to instill Rapid Processing which puts more responsibility on the individual to take care of themselves."

"Yes"

"CPCS needs to be compatible w/AMSOE & COMPES."

"Present system adequate."

Comments/Second Iteration: "An AF wide standard for checklists should be implemented."

"Strong leadership is a must to ensure individual preparedness."

"Yes."

"Get more loggies out of the office and into gloves. Those who plan need to see the final load result. Where are the tiedowns? Where are the seat stanchions? How far up/down is the vent fitting?"

"In unit and pre-mobilization briefing -also training and exercise."

"The answers to this question show the level of expertise of those who answer and a lack of scenario for the question. You must start from something (a checklist is good) and tailor it as needed for the situation. People need to know what to expect so they can mentally prepare and so that you can provide them with guidance and SOE for movement. This could be as simple as 'get on the bus, you're going to Ramstein' to a full blown brief. Fortunately, given enough info, people can prepare themselves."

"Tools are OK. More commander involvement is needed to ensure personnel are prepared."

28. Rank the following as tools for marshalling equipment and assembling personnel for transport in an intra-theater environment.

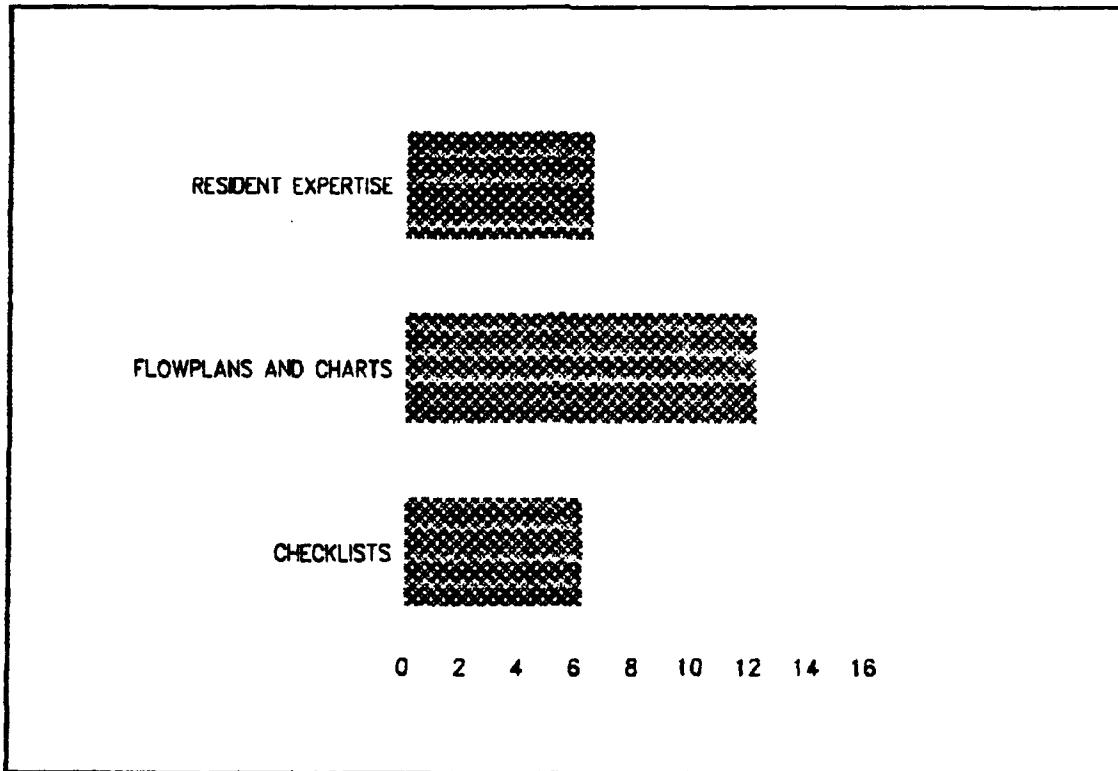


Figure 35. Weighted Rankings for Question #28

Responses/Second Iteration: 78.6% chose FLOWPLANS AND CHARTS as the best tool. 7.1% chose CHECKLISTS as the best tool. 14.3% chose RESIDENT EXPERTISE as the best tool. See Figure 35.

29. Are the available tools for marshalling equipment and assembling personnel for transport good enough? If not, how could they be improved?

Comments/First Iteration: "It's OK."

"Yes."

"Yes"

"No. Build a faster way of processing cargo."

"They are sufficient."

"Yes"

"Yes"

"Simple time-phased action chart on portable computer with modern capability to quickly notify all interested and concerned parties over common telephone lines or by telefax. If info is in data base, it can be selected and used. Of info is not in data base, it can be added simply quickly and used immediately without any hassle."

"Yes"

"No. People would benefit by being forced to carry a credit card or something that carries all their necessary basic information needed for deployment. MITLA seems to be covering these needs."

"Common sense used by all goes much farther than any Flowplan or Chart I've used..."

"Present system adequate."

Comments/Second Iteration: "Tools are OK. There is just so much red tape to go through that the tools are necessary."

"No opinion."

"Yes: Flow plan and common sense."

"For intra-theater movement, common sense is best."

"Sufficient (need equipment pre-marshalling yard)."

"Automation for cargo processing would aid greatly."

"Yes, the tools are sufficient (AFR 28-4, AMSOE). They just need to be supported and complied with (from commanders on down)."

30. Rank the following as tools for loading equipment and personnel onto transports in an intra-theater environment.

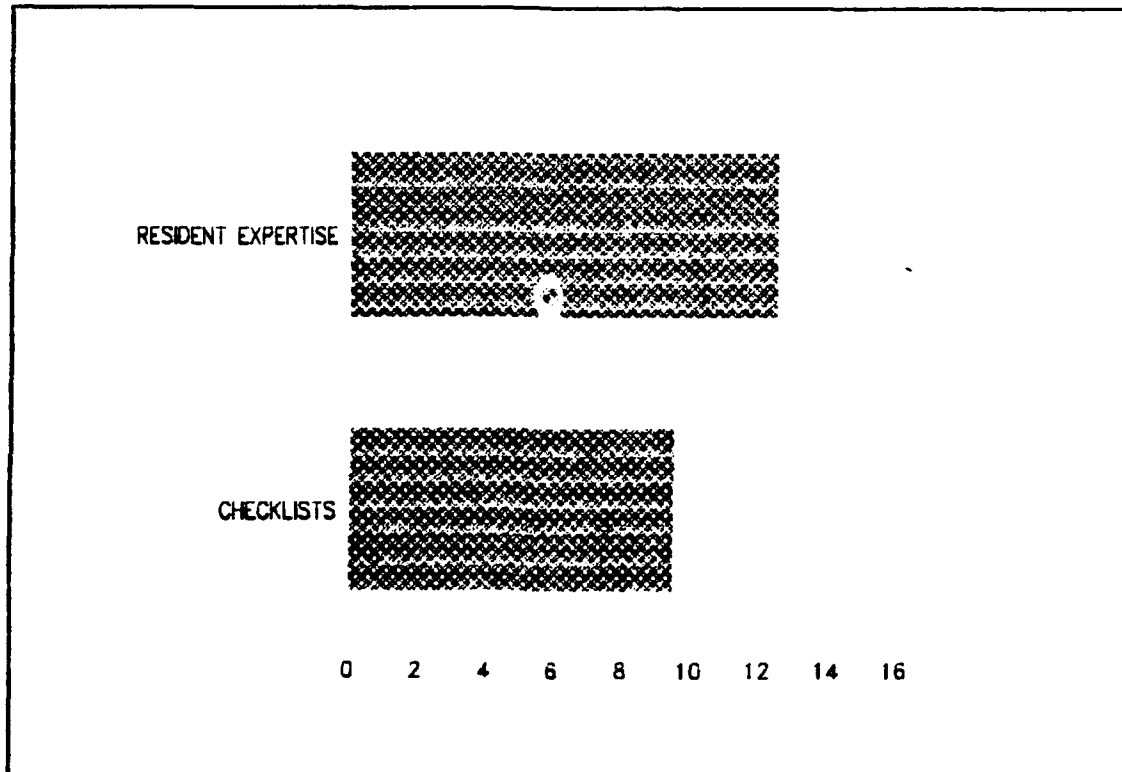


Figure 36. Weighted Rankings for Question #30

Responses/Second Iteration: 73.3% chose RESIDENT EXPERTISE as the best tool. 26.7% chose CHECKLIST as the best tool. See Figure 36.

31. Are the available tools for loading equipment and personnel onto transports good enough? If not, how could they be improved?

Comments/First Iteration: "Experience & training are so important."

"Yes."

"Yes, but very dependent on transport support personnel."

"Yes"

"They are sufficient."

"Yes"

"Air Force needs to put out more guidance on loading trucks and who is responsible for what, ie, what the driver is responsible for, what the unit is responsible for. Especially in movement of weapons/ammo and other sensitive items."

"Yes"

"No. We have too many different sized aircrafts and too many different types of vehicles to move the stuff.

We need to have more standardization throughout the transportation."

"1) Loggies need more training in/on/around transport vehicles.

2) How can I determine the best mode of surface transport if I don't know what the thing is/does or is capable of?"

"Present system adequate."

Comments/Second Iteration: "Chain down devices takes much too long to secure. There has to be a quicker device."

"They are ok."

"Definitely need a well qualified team to aid in loading - On the job training during the move is not the time to learn - it impedes the flow of transport."

"These tools are good. The responsibility and processes need improvement."

"Training and exercise."

"Yes, but...too often MHE (because of high-use rate) is broken and therefore not at full capacity."

32. Rank the following as tools for directing, coordinating, and controlling mobilization in an intra-theater environment.

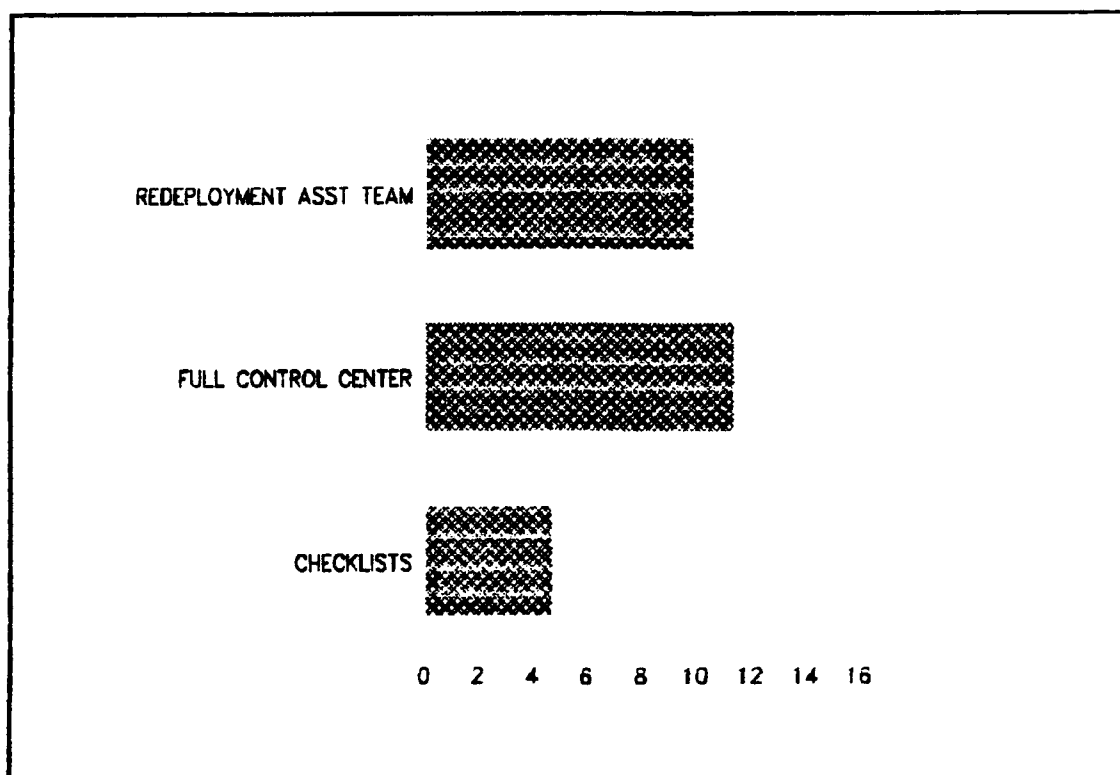


Figure 37. Weighted Rankings for Question #32

Responses/Second Iteration: 60.0% chose FULL CONTROL CENTER as the best tool. 40.0% chose REDEPLOYMENT ASSISTANCE TEAM as the best tool. See Figure 37.

33. Are the available tools for directing, coordinating, and controlling mobilization good enough? If not, how could they be improved?

Comments/First Iteration: "Yes."

"Yes"

"Yes. If you have a fully staffed mobility machine in the intra-theater."

"They are sufficient."

"Yes"

"There doesn't seem to be an org structure for follow-on moves after a unit leaves home station. There is no guidance for who has responsibility for follow-on move. Equipment (cargo) to be moved is held by the user until the last possible moment before being released for shipment. Higher HQ has not emphasized training within a unit for follow-on movement."

"Yes, when used. Many units did not deploy to STORM with log plans personnel."

"Present system adequate."

"Yes"

"No. They need to be standardized and accessible from the pentagon to the element."

"Great concept [referring to Redeployment Assistance Teams], but it never happened during DESERT STORM! (Unless you were at a major facility.) Most of us in SAC (tanker units) had to fend for ourselves on/during intratheater mobilizations. Imagine the frustration of one 2LT Loggie attempting to redeploy 15 KC-135, 1100 ST [tons] of Cargo, & 900 pax [passengers] to 43 separate destinations! Given a choice, I would have much rather seen a Military Customs team come into help vs. a RAT TEAM."

Comments/Second Iteration: "I've no idea what its like in a deployed location."

"Where are you going to get a staff for intra-theater movement? The deployed loggie along with the sq. commanders can make it happen. Each unit must be deployed with (by AFR

28-4) people who are -2 qualified, load buildup, etc. trained. [author's note: I have been unable to find this requirement in any Air Force regulation, including AFR 28-4] Anyone whose redeployed a unit has faced the same situation of intra-theater movement. You have to work with what you've got or be able to direct those to get the job done."

"A fully staffed mobility organization is desirable, but is not cost effective. A RAT makes more sense."

"Needs complete overhaul starting at Air Staff level!! Need to go to war the way we practice."

"Yes. As long as communications are up with all the key players."

"Without a good RAT, you're in trouble unless ALCE comes in early and has a lot of expertise and patience."

"A good RAT will work effectively. The full mobility center will slow the process."

"The wing commander (everywhere I've been) needs to take a more active/supportive role of mobility/IMO to get the job done. Its not easy for a Lt, Capt, Maj to tell LTCs, and COLs what/how to do things. I think this reorg has unbelievably messed things up. Its pushed us further from the source of power. How can anyone take you seriously?"

"Yes, the Dep Com (deployed CC) and troop commanders are responsible, if no RAT or DACG is available."

34. Additional comments on the basic actions required for intra-theater mobility and the tools used to mobilize.

Comments: "This survey raises an interesting issue. All mobility training, exercises, and instructions I have encountered have been aimed at getting a unit from its home base to a deployment base. I have yet to see follow-on, intra-theater mobility addressed in a plan or exercise. Neither have I seen redeployment from theater to home base exercised, except when it was made necessary, because a unit had actually deployed somewhere and had to come home.

My unit (and probably others) lacks depth of trained personnel: only a few key NCOs are really competent at loadplanning and other technical skills - especially if specialized computer software is involved. If these 'indispensable' individuals are not available, the mobility machine could stop. More people should be trained in loadplanning.

Regarding computers: The Air Force is acquiring sophisticated new software faster than it is training people to use it. I have had no formal computer training since I was taught to program in ALGOL by punching cards for a Burroughs 5500 at the USAF Academy in 1971. Since then, I have learned to use my Radio Shack TRS-80 (64K) at home, and am still trying to master WORDSTAR at the office. Only those who have time to tinker with computers daily are able to keep up. Officers and senior NCOs don't have time to learn through informal channels, and we are becoming more

and more dependent on our troops to manage our information for us. Regular, formal training is a must if leaders are to acquire and maintain adequate computer literacy."

"Lesson learned from DESERT STORM show that if each unit keeps proper control of their equipment and their paperwork, a redeployment or an intra-theater move could be performed without major difficulties."

"1. A redeployment Mobility Plan should be developed for every location. This does not have to be as large as existing Mobility Plans but should cover the following areas.

- A. How to outprocess before leaving a base
- B. Identifying OPRs for specific actions
- C. Identifying processing locations
- D. Identifying procedures for dissemination of processing information

- a. where will schedules be posted
- b. what type of Transportation
- c. cargo preparation

"1) Personnel: We need more Loggies - Period. Why is it that the ANG has 2 full-time Loggies while the AF has 6 or more per Wing? It is no wonder we in ANG take shortcuts to get the job done.

Great Survey! We need more of this stuff! Good Luck w/thesis!"

"Provide information on the required action. Update and coordinate as necessary. Allow 'experts' to do their job.

If above is accomplished, available tools will be more than adequate."

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Vita

Captain Christopher S. Cummins was born on 8 November 1959 in Northampton, Pennsylvania. He graduated from Punahou School in Honolulu, Hawaii in 1978. In 1983, he graduated from Franklin and Marshall College, Lancaster, Pennsylvania with a Bachelor of Arts degree (major in Economics). After receiving his USAF commission from Officer Training School in December of 1985, he served as a Logistics Plans officer in the 726th Tactical Control Squadron, Homestead AFB, Florida, where he participated in numerous mobilizations and deployments. In 1988, he was assigned to the 388th Tactical Fighter Wing, Hill AFB, Utah. As Wing Mobility Officer, he served with this F-16 fighter wing in Panama during Operation JUST CAUSE and in the Persian Gulf during Operations DESERT SHIELD and DESERT STORM, where he was responsible for both the inter-theater and the intra-theater mobilization of the wing. He entered the School of Systems and Logistics, Air Force Institute of Technology, in May 1991. Captain Cummins is also a graduate of Squadron Officer School by correspondence.

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13. ABSTRACT (Maximum 200 words) The study investigated the process of USAF unit level mobilization for movement within a theater of operations. Virtually all of the guidance and organization for unit level mobilization within the USAF is focused on inter-theater movement. Consequently, while the need for theater mobility is real, USAF units may not be well grounded in the procedures and techniques necessary to move successfully. The purpose of the study was to describe the essential process of unit level mobilization and determine the differences from inter-theater mobilizations. In addition, the available tools for accomplishing the tasks of mobilization within a theater of operations were investigated. The literature review established the need for theater mobility and showed that intra-theater mobilization occurs under more restrictive conditions. The methodology developed a basic process model of unit mobilization actions. The model was built on seven essential task areas: identification of requirements, prioritization and sequencing, physical preparation, load planning, marshalling, and direction and control. The model was validated through a Delphi survey. USAF personnel active in mobility received questionnaires on the subject, and their responses served to achieve a consensus of expert opinion.				
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